



VLAAMSE OVERHEID

DEPARTEMENT MOBILITEIT EN OPENBARE WERKEN  
WATERBOUWKUNDIG LABORATORIUM



## Factual Data Report

Platen van Ossenissee



### Studie van dwarsstromingen aan de Platen van Ossenissee : **Factual Data Report meetcampagne maart - april 2008**

14 augustus 2008  
I/RA/11313/08.045/YDK

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## Documentcontroleblad

### Document Identificatie

<b>Titel:</b>	Studie van dwarsstromingen aan de Platen van Ossenis : Factual Data Report meetcampagne maart - april 2008
<b>Project:</b>	Factual Data Report
<b>Opdrachtgever</b>	Afdeling Waterbouwkundig Laboratorium
<b>Documentref.:</b>	I/RA/11313/08.045/YDK
<b>Documentnaam</b>	K:\PROJECTS\11\11313 - WL - Linux 2D Modelinstrumentarium\10-Rap\RA08045\RA08045_factualdatareport_v2.0.doc

### Revisies

Versien	Datum	Auteur	Omschrijving
2.0	14/8/2008	YDK	Final version
1.0	1/7/2008	YDK/BDC/BOB	concept

### Verdeellijst

Naam	# ex.	Bedrijf/overheid	Functie m.b.t. het project
Joris Vanlede	5	Afdeling Waterbouwkundig Laboratorium	Client

### Goedkeuring

Versie	Datum	Auteur	Projectleider	Directie
2.0	14/8/2008	YDK	GVH	MSA
1.0	1/7/2008	YDK/BDC/BOB	GVH	MSA



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## **1. INLEIDING**

### **1.1. De opdracht**

Dit rapport kadert in het project 'Evaluatie en verbetering van het numerieke modelinstrumentarium met betrekking tot de Vlaamse getijwateren en (kust)havens' in opdracht van het Departement Mobiliteit en Openbare Werken, Waterbouwkundig Laboratorium (16EB/06/16). Onderhavige studie betreft een bijkomende opdracht m.b.t. de dataverwerking van twee meetcampagnes ter hoogte van de Platen van Ossenis, dit in het kader van het onderzoek naar dwarsstromingen aan de vermelde plaat. Metingen van snelheid, waterstand en saliniteit werden uitgevoerd zowel voor een korte als een lange periode.

De gebruikte gegevens werden geleverd door twee partijen, nl.

- Waterbouwkundig Laboratorium, Departement Mobiliteit en Openbare Werken; en
- meetadviesdienst – MAD, Rijkswaterstaat Nederland.

### **1.2. Doel van de meetcampagne**

Bij extreem springtij ontstaan hinderlijke dwarsstromingen in de vaargeul ter hoogte van het oosten de Platen van Ossenis. In 2005 strandde hier het containerschip Fowairet. Om deze complexe stromingen in beeld te brengen werden in het recente verleden door de Nederlandse Rijkswaterstaat (meetadviesdienst – MAD) meerdere meetcampagnes uitgevoerd.

Op basis van deze meetgegevens werd door het Waterbouwkundig Laboratorium i.s.m. IMDC nv. een hydrodynamisch model opgesteld in de software Delft-3D. De neervorming kan gereproduceerd worden maar de vorm van de neer en zijn dynamisch gedrag blijven onduidelijk/onzeker. Om in de toekomst een goede inschatting te kunnen maken van het potentieel risico voor de scheepsvaart en om de modellen verder af te regelen zijn bijkomende detailmetingen onontbeerlijk. Deze gegevens worden weergegeven in dit rapport.

### **1.3. Overzicht van de studie**

Tijdens de uitvoering van de studie zijn de volgende rapporten geschreven:

- Studie van dwarsstromingen: voorstudie (I/RA/11313/08.006/BOB);
- Factual Data Report meetcampagne maart - april 2008: Studie van dwarsstromingen aan de Platen van Ossenis (I/RA/11313/08.045/YDK)

### **1.4. Opbouw van het rapport**

Dit rapport behandelt de resultaten van snelheidsmetingen (en waterpeil- en saliniteitsmetingen) aan de Platen van Ossenis.

In Hoofdstuk 2 worden zowel de langdurige als de korte meetcampagnes algemeen beschreven. Ook een bespreking van de verschillende meettoestellen kan hier teruggevonden worden. Het meetverloop en de hydrometeorologische gegevens van de betreffende periode zijn opgenomen in Hoofdstuk 3. Hoe de meetdata verwerkt en gerapporteerd wordt, is terug te vinden in Hoofdstuk 4. Een eerste analyse van de snelheidsmetingen, evenals van de saliniteit en van de waterpeilen, wordt beschreven in Hoofdstuk 5.



## 2. DE MEETCAMPAGNE

Aan de Platen van Ossenis werden meettoestellen uitgezet met het oog op de meting van dwarsstromingen die de scheepvaart hinderen. Hiervoor werden zowel kortetermijn- als langetermijnmetingen uitgevoerd.

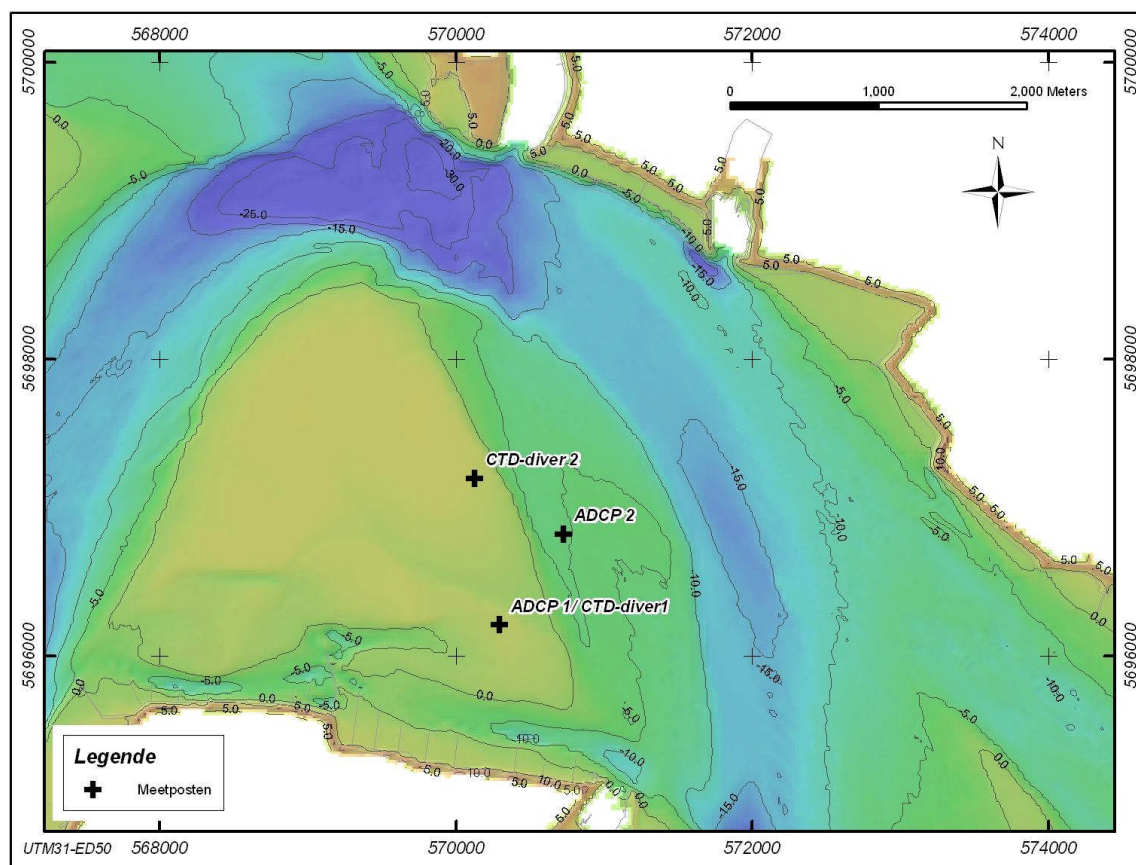
De kortetermijnmetingen beoogden een ruimtelijk beeld te geven van de neervorming en zijn evolutie. Het extreme springtij van 7 april 2008 werd hiervoor geselecteerd waarbij snelheden werden opgemeten langs raaien parallel en dwars op het Zuidergat. Op 6 en 8 april 2008 werd ook neervorming voorspeld waardoor ook op deze dagen snelheid in parallelle raaien werd opgemeten.

Bij de langetermijnmetingen lag de focus voornamelijk op het in beeld brengen van de tijdsevolutie van de neervorming en of dat de neer zich inderdaad slechts ontwikkelt bij extreme springtijden. Hiervoor werden twee ADCP's uitgezet op een vaste locatie aan de vaargeul, de oostelijke rand van de plaat en op de zuidoostelijke zijde van de plaat voor telkens een lange periode. De ADCP aan de linkerzijde van de vaargeul heeft door technische problemen geen meetdata vergaard en zal dan ook niet verder besproken worden in dit rapport. Bij deze langdurige meting werden ook de saliniteit en het waterpeil gemeten op twee locaties op de plaat d.m.v. CTD-Divers. De meting betreft de volgende periode: 7/03/2008 – 10/04/2008.

### 2.1. Beschrijving van de meetcampagne

Om de tijdsevolutie van de neervorming in kaart te brengen, werd op een aantal vaste locaties het snelheidsprofiel gemeten, evenals de saliniteit en het waterpeil. Volgende locaties werden bemeet (Figuur 2-1 en Tabel 2-1):

- zuidoostelijke deel van plaat (ADCP1 / CTD diver 1);
- het centrum van het oostelijk, verzonken gedeelte van de plaat (ADCP 2);
- oostelijke rand van de plaat (CTD diver 2): dit punt laat toe de manier waarop de plaat overstroomt te bestuderen. Ook geeft het informatie over de interactie tussen de stromingen over de plaat en de langsstromingen;



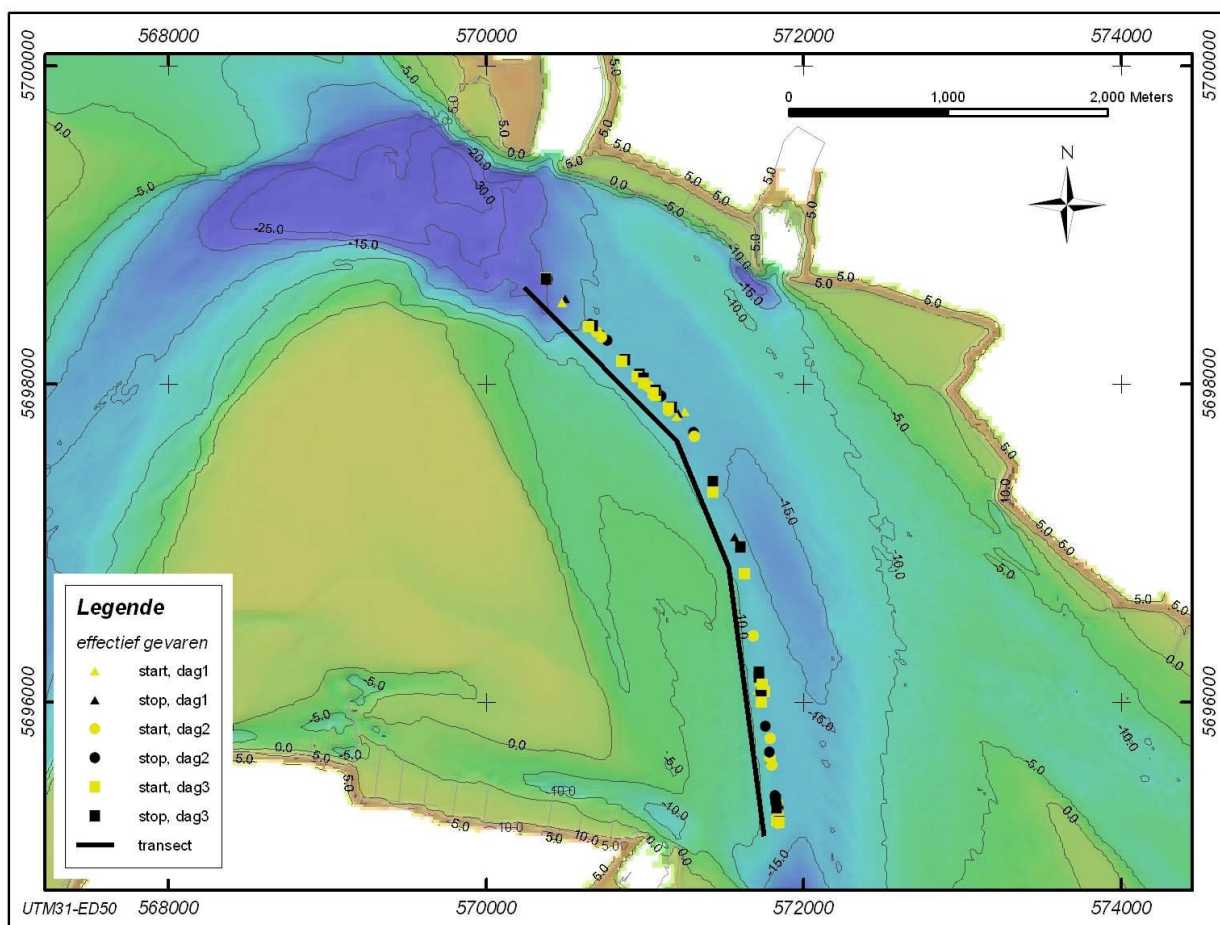
Figuur 2-1: Overzicht van de vaste meetlocaties (UTM-ED50)

Tabel 2-1: Overzicht van de vaste meetlocaties (UTM-ED50)

Meetlocatie	X	Y
ADCP1 / CTD diver 1	570295.6	5696211
ADCP2	570725.6	5696825
CTD diver 2	570127.2	5697200

Op 7 maart 2008 werden alle toestellen geplaatst behalve ADCP 2, die op 3 maart werd afgezonken vanop een schip door RIKZ (Rijkswaterstaat Zeeland).

Verder werd op 3 dagen gedurende het springtij van 6 tot 8 april 2008 een snelheidsmeting uitgevoerd door RIKZ (met het schip Kaloo) gedurende een periode die overeenkomt met de verwachte maximale vloed tot en met de getijfase waarin neervorming werd verwacht, van 3 uur voor hoogwater tot 1 uur na hoogwater. Op deze drie dagen werd telkens een raai gevaren langs de rand van de verzonken plaat. Een overzicht van de verschillende transecten is getoond in Figuur 2-2. De exacte raai beschrijving kan teruggevonden worden in Tabel 2-2.



Figuur 2-2: Overzicht van de meettraaien MAD (UTM-ED50)

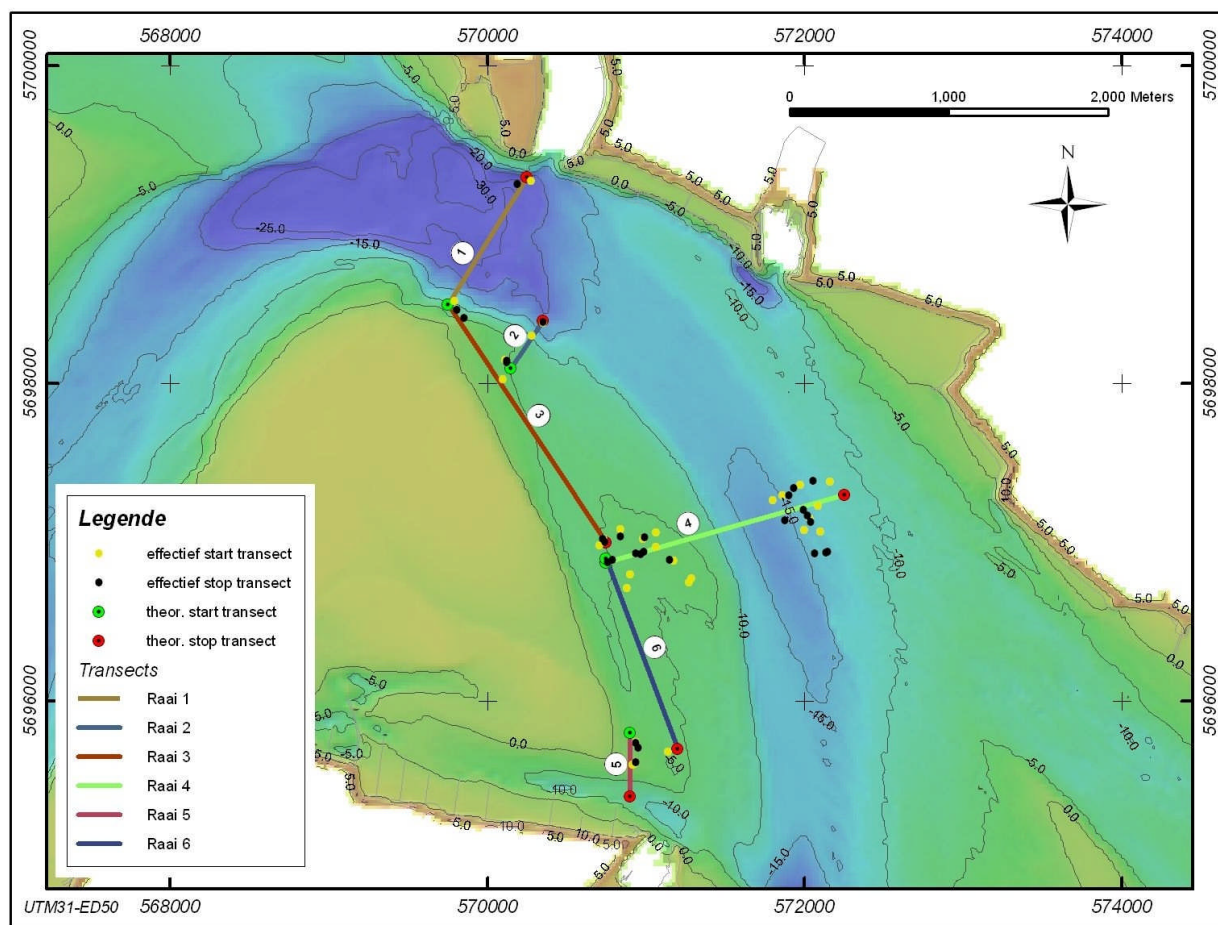
Tabel 2-2: Overzicht van de meettraaien MAD (UTM-ED50)

Meetraai	Beginpt. X	Beginpt. Y	Eindpt. X	Eindpt. Y	Gem Lengte [m]	Gem Koers [degr.]
<b>06/04/08</b>						
0381001	571832.4	5695321	571251.4	5697827	2572	283
0381002	571840.3	5695274	570498.1	5698542	3533	292
0381003	571827.3	5695337	570478.7	5698516	3453	293
0381004	571589.4	5697007	571836.7	5695262	1762	278
0381005	571566.1	5697043	571823.4	5695366	1696	279
0381006	571819.8	5695352	571209.7	5697819	2541	284
0381007	571789	5695640	571201.3	5697800	2238	285
0381008	571709.5	5696076	570387.7	5698657	2900	297
<b>07/04/08</b>						
0381009	571838.5	5695336	570382.1	5698660	3629	294
0381010	571838.1	5695307	570383.2	5698659	3655	293
0381011	571827.9	5695385	570374.7	5698667	3589	294

<i>Meetraai</i>	<i>Beginpt. X</i>	<i>Beginpt. Y</i>	<i>Eindpt. X</i>	<i>Eindpt. Y</i>	<i>Gem Lengte [m]</i>	<i>Gem Koers [degr.]</i>
0381012	571789.2	5695648	570658.6	5698380	2956	292
0381013	571820.8	5695399	570654.7	5698367	3189	291
0381014	571835.3	5695366	571308.4	5697695	2387	283
0381015	571818.9	5695411	571312.7	5697672	2317	283
0381016	571682.8	5696417	571104.8	5697924	1614	291
0381017	571761.5	5695847	571150.4	5697836	2081	287
0381018	571791	5695770	570719.2	5698314	2761	293
0381019	571730.7	5696067	570695.8	5698329	2487	295
0381020	571731.2	5696101	571085.6	5697942	1951	289
0381021	571784.9	5695686	571057.7	5697947	2376	288
0381022	571801.2	5695605	571068.1	5697960	2466	287
0381023	571827.5	5695370	571020.9	5697986	2738	287
0381024	571839.7	5695291	570762.2	5698274	3171	290
0381025	571847.6	5695249	570729.3	5698294	3244	290
0381026	571841.6	5695235	570387.3	5698660	3721	293
<b>08/04/08</b>						
0381027	571823.6	5695387	570376.3	5698667	3585	294
0381029	571831.2	5695333	571067.4	5697933	2710	286
0381030	571831.6	5695254	570965.6	5698064	2940	287
0381031	571720.9	5696156	570953	5698046	2040	292
0381032	571753.1	5696066	570994.5	5698035	2110	291
0381033	571734.8	5696062	570992.8	5698005	2079	291
0381034	571736.3	5695998	570671	5698367	2598	294
0381035	571429.9	5697386	570645.3	5698361	1251	309
0381036	571429.6	5697323	570876.7	5698156	1000	304
0381037	571602.8	5696977	570854.8	5698143	1385	303
0381038	571628.9	5696809	571171.4	5697855	1142	294
0381039	571716.3	5696187	571147.4	5697850	1757	289
0381040	571741.5	5696113	571068.5	5697960	1966	290
0381041	571843.3	5695249	571052.5	5697948	2813	286
0381042	571844.2	5695241	570378.2	5698663	3723	293

Enkel op 7 april 2008 werd met een tweede (Vlaams) schip, de Veremans, een aantal dwarsraaien gevaren aangevuld met extra langdraaien boven het verzonken gedeelte van de plaatrand (Figuur 2-3 en Tabel 2-3).





Figuur 2-3: Overzicht van de meettraaien WLB (UTM-ED50)

Tabel 2-3: Overzicht van de meettraaien WLB (UTM-ED50)

Meetraai	Beginpt. X	Beginpt. Y	Eindpt. X	Eindpt. Y	Gem Lengte [m]	Gem Koers [degr.]
1	569810.1	5698465	570274.7	5699276	935	60
1	569795.2	5698521	570190.1	5699256	834	62
2	570122	5698131	570353.8	5698384	342	47
2	570113.5	5698150	570353.6	5698390	339	45
2	570122.3	5698143	570279.9	5698302	224	45
3	570740.9	5696999	570095.5	5698030	1216	302
3	570710	5696979	569854.7	5698413	1669	301
4	570981	5697022	572055.9	5697385	1134	19
4	570991.8	5697031	572163	5697383	1223	17
4	570735	5697023	571931.3	5697341	1238	15
4	570729.9	5697022	571972.6	5697362	1288	15
4	570841.6	5697083	571904.1	5697298	1084	11
4	570841.6	5697035	571858.8	5697296	1050	14

<i>Meetraai</i>	<i>Beginpt. X</i>	<i>Beginpt. Y</i>	<i>Eindpt. X</i>	<i>Eindpt. Y</i>	<i>Gem Lengte [m]</i>	<i>Gem Koers [degr.]</i>
4	570898.9	5696799	572037.2	5697129	1185	16
4	571152.1	5696890	572032.3	5697148	917	16
4	571287.1	5696771	572143.7	5696940	873	11
4	571271.1	5696746	572063.4	5696928	813	13
4	571173.8	5696885	572017.9	5697170	891	19
4	570760.2	5696872	572082.8	5697228	1370	15
4	570882.7	5696709	572134.7	5696933	1272	10
4	570964.8	5696923	572101	5697068	1145	7
4	571065	5697063	571995.1	5697204	941	9
4	570986.5	5696938	572000.5	5697075	1023	8
4	571064.3	5696973	571877.1	5697140	830	12
4	570934.1	5696928	571797.5	5697263	926	21
5	570924	5695601	570953.4	5695705	108	74
5	570934.5	5695741	570935.5	5695615	126	270
5	570914.2	5695598	570938.7	5695733	138	80
6	571141.6	5695678	570789.4	5696891	1263	286

## 2.2. Instrumenten

### 2.2.1. ADCP

De stroommetingen zijn uitgevoerd met behulp van een RD Instrument ADCP 600 kHz Workhorse. De ADCP is een *Acoustic Doppler Current Profiler* en meet verticale profielen van de stroomsnelheid door middel van akoestische energie en dopplerverschuiving (RD Instruments, 2003). Voor de positie en de koers wordt er een Hemisphere Crescent VS110 GPS Compass geïnstalleerd. De technische details van de ADCP 600 kHz Workhorse zijn beschreven in APPENDIX A.

De mobiele ADCP is aan een ijzeren paal geplaatst, ongeveer in het midden van de meetboot aan stuurboordzijde. De transducer is verticaal naar de bodem gericht en verdeelt de waterkolom in een aantal cellen. De zender-ontvanger en het computersysteem worden aangesloten aan randapparatuur zoals de differentiële GPS-ontvanger en het gyrokompas.

De stationaire ADCP daarentegen werd bevestigd aan een ijzeren profiel en deels ingegraven. De bijhorende batterij werd deels ingegraven op een tweetal meter van de sensor zodat er geen invloed op de metingen optrad.

De meetinstellingen gebruikt bij de verschillende ADCP's zijn samengevat in Tabel 2-1 en Tabel 2-2 voor respectievelijk de mobiele en stationaire ADCP's.



*Figuur 2-1: ADCP1 met batterij*

Tabel 2-1: Enkele instellingen gebruikt voor de mobiele ADCP's

<b>instelling</b>	<b>Veremans (meetraai WLB)</b>	<b>Kaloo (meetraai MAD)</b>
<i>frequentie (kHz)</i>	600	600
<i>bingrootte (m)</i>	0.5	0.25
<i>aantal water pings / ensemble</i>	2	10
<i>aantal bodem pings / ensemble</i>	2	8
<i>ensemble interval (s)</i>	9	5
<i>saliniteit (ppt)</i>	opmeting	opmeting
<i>temperatuur (°C)</i>	opmeting	opmeting
<i>plaatsbepaling</i>	Hemisphere Cresent VS110 GPS Compass	Aquarius met LRK (zender Hansweert)
<i>data-acquisitie software</i>	WinRiver	WISEA

Tabel 2-2: Enkele instellingen gebruikt voor de stationaire ADCP's

<b>instelling</b>	<b>ADCP1</b>	<b>ADCP2</b>
<i>frequentie (kHz)</i>	1200	1200
<i>bingrootte (m)</i>	0.25	0.5
<i>aantal bins / ensemble</i>	23	24
<i>aantal water pings / ensemble</i>	20	20
<i>ensemble interval (s)</i>	120	120
<i>saliniteit (ppt)</i>	35	35
<i>temperatuur (°C)</i>	5	5
<i>data-acquisitie software</i>	WISEA	WISEA

### 2.2.2. CTD-Diver

Een CTD-Diver wordt gebruikt om de diepte, de conductiviteit en de temperatuur te meten. Deze parameters zijn nodig om de geluidssnelheid van de waterkolom te berekenen aan de hand van saliniteit en temperatuur. Saliniteit wordt berekend a.h.v. temperatuur, conductiviteit en druk in de pps-78 formule (Unesco, 1991)(zie APPENDIX C).

Het instrument voert elke 10 minuten een meting uit. Technische details van de CTD-Diver zijn beschreven in APPENDIX A.



### 3. HET MEETVERLOOP

#### 3.1. Meetperiode

Gedurende 3 dagen zijn er metingen uitgevoerd aan de Platen van Ossenissee. Tijdens deze 3 dagen (6-7-8 april 2008) werden er langsraaien gevaren en de 2<sup>e</sup> dag kwam er ook nog een reeks dwarsraaien bij. Op 6 april zijn er in 1 uur 46 minuten 8 langsraaien gevaren, op 7 april waren het er in 5 uur 13 minuten 18 langsraaien, en op 8 april 15 raaien in 3 uur 4 minuten. Op 7 april werden er gedurende 4 uur 16 minuten 30 bijkomende dwarsraaien gevaren; ook enkele langsraaien dicht bij de plaat werden opgemeten.

#### 3.2. Hydrometeorologische condities

##### 3.2.1. Verticaal getij

Opgemeten getijgegevens aan Hansweert werden bekomen van [www.hmcz.nl](http://www.hmcz.nl). De oorspronkelijke waterstanden in m NAP werden hierbij omgezet naar m TAW. In APPENDIX B kan het waterpeilverloop ter hoogte van Hansweert op 06-07-08/04/2008 teruggevonden worden. In Tabel 3-1 zijn de belangrijkste karakteristieken van het getij verzameld voor de 3 meetdagen in april.

Tabel 3-1: Opgemeten hoog en laag tij bij Hansweert op 06-07-08/04/2008

<b>6 April 2008</b>		
<b>HW/LW</b>	<b>Time [MET]</b>	<b>Water level [m TAW]</b>
	<b>Hansweert</b>	
<b>HW (1)</b>	02:40	5.39
<b>LW (2)</b>	09:20	-0.12
<b>HW (3)</b>	15:10	5.29
<b>LW (4)</b>	21:30	0.02
<b>7 April 2008</b>		
<b>HW/LW</b>	<b>Time [MET]</b>	<b>Water level [m TAW]</b>
	<b>Hansweert</b>	
<b>HW (1)</b>	03:10	5.19
<b>LW (2)</b>	10:00	-0.29
<b>HW (3)</b>	16:00	5.27
<b>LW (4)</b>	22:10	-0.10
<b>8 April 2008</b>		
<b>HW/LW</b>	<b>Time [MET]</b>	<b>Water level [m TAW]</b>
	<b>Hansweert</b>	
<b>HW (1)</b>	04:00	5.17
<b>LW (2)</b>	10:50	-0.46
<b>HW (3)</b>	16:40	5.13
<b>LW (4)</b>	22:50	-0.17

Tabel 3-2: Vergelijking van de getijden van de 3 meetdagen met decadale waarden van 1991-2000 van het doottij, springtij en gemiddeld tij aan Hansweert.

	<b>Doodtij (1991 - 2000)</b>	<b>Gem tij (1991 - 2000)</b>	<b>Springtij (1991 - 2000)</b>	<b>Getij 06/04/2008</b>	<b>Getij 07/04/2008</b>	<b>Getij 08/04/2008</b>
<b>Waterstand [m TAW]</b>						
HW (1)	4.29	4.76	5.11	5.39	5.19	5.17
LW (2)	0.61	0.27	0.02	-0.12	-0.29	-0.46
HW (3)	-	-	-	5.29	5.27	5.13
<b>Tijverschil [m]</b>						
Eb (1 naar 2)	3.68	4.49	5.09	5.51	5.48	5.63
Vloed (2 naar 3)	3.68	4.49	5.09	5.41	5.56	5.59
<b>Duur [uu:mm]</b>						
Eb (1 naar 2)	6:25	6:23	6:26	6:40	6:50	6:50
Vloed (2 naar 3)	6:14	6:02	5:54	5:50	6:00	5:50
Getij (1 naar 3)	12:39	12:25	12:20	12:30	12:50	12:40
<b>Getijcoëfficiënt</b>						
Eb (1 naar 2)	0.82	1.00	1.13	1.23	1.22	1.25
Vloed (2 naar 3)	0.82	1.00	1.13	1.20	1.24	1.24

De getijcoëfficiënten van 1.20 tot 1.25 voor de 3 meetdagen tonen een nog groter tijverschil aan dan die van springtij voor het tienjaarlijks gemiddelde van 1991-2000.

### 3.2.2. Meteorologische data

De meteorologische data aan Woensdrecht, nabij Bergen op Zoom zijn verkregen van de Weather Underground website (Wunderground, 2008).

Het weer was tijdens de metingen op 6-7-8 april vrij constant. De luchttemperatuur varieerde tussen -1 en 11°C met een gemiddelde van 4°C. De wind was variabel maar blies de eerste dag vooral uit het noorden met een gemiddelde snelheid van 5 km/u, de 2<sup>e</sup> dag was de richting veranderlijk en veranderde van noordoost over west naar zuidwest met een gemiddelde snelheid van 10 km/u. De 3<sup>e</sup> dag varieerde de windrichting van zuid naar zuidwestelijk aan een gemiddelde snelheid van 4 km/u. Gedurende de meetperiode was er bewolking die afnam na verloop van tijd. Het heeft niet geregend.

Bij de langdurige meetperiode (7 maart tot 13 april) heerste er een gemiddelde luchttemperatuur van 5 °C met een minimum en maximum van respectievelijk -5 en 15°C. Algemeen blies er een matige wind van gemiddeld 13 km/u. Er zijn geen sluitende gegevens over de bewolking en neerslag.

### 3.3. Opmerkingen op de data

Op 7 april 2008 werd gelijktijdig gemeten met verschillende schepen, het ene op de langsraai en het andere op de dwarsraai. Op beide schepen was er een verschillend type ADCP geïnstalleerd waardoor op het schip Veremans (op de dwarsraai) een kleinere meetfrequentie werd toegepast,

wat resulteerde in 'grotere' *ensembles*. Dit is in de figuren zichtbaar als bredere verticale banden voor elk verticaal snelheidsprofiel. Dit fenomeen is dus geen gevolg van naverwerking maar van een licht verschillende data-aquisitie.

## 4. DATAPROCESSING

### 4.1. ADCP data met Sediview

De stromingsgegevens die verkregen zijn door de ADCP zijn verwerkt met Sediview. De Sediview-software bevat verscheidene routines voor data-analyse, opmaak en uitmiddelen en is in staat data te exporteren in een variëteit aan numerieke en grafische formaten (DRL, 2003).

#### 4.1.1. Verwerking van ADCP data

De ADCP meet het merendeel van de waterkolom van juist vóór het instrument tot ongeveer 6% boven de bodem. De onderste waterlaag bij de bodem wordt namelijk niet gebruikt bij de snelheidsmetingen omwille van de zgn. zijlobinterferentie. Wanneer de ADCP een akoestische trilling uitzendt, wordt een klein deel van de energie overgebracht naar de zijlobben in plaats van terug naar de ADCP. Zijlobreflectie aan de bodem kan interfereren met de echo in het watermedium en zo voor verkeerde data zorgen. De dikte van de zijloblaag is ongeveer 6% van de afstand tussen de zenders op de ADCP en de bodem.

De data van de bovenste 1.5 meter onder het wateroppervlak wordt niet verzameld. Dit komt omdat de ADCP ongeveer een meter onder water hangt en de eerste halve meter onder de zenders geen metingen geeft.

In Sediview wordt de geluidssnelheid in het water berekend door middel van de temperatuur, de saliniteit en de diepte, welke verkregen zijn door de CTD-Diver. De geluidssnelheid wordt gebruikt om de gemeten stroomsnelheid van elke cel te corrigeren aan de hand van onderstaande formule:

$$v_c = \frac{v_m \times v_{sound}}{v_{adcp}}$$

waarbij:

- $v_c$  = gecorrigeerde stroomsnelheid van het water
- $v_m$  = gemeten stroomsnelheid van het water
- $v_{sound}$  = actuele geluidssnelheid
- $v_{adcp}$  = geluidssnelheid in de ADCP configuratie (1500 m/s)

#### 4.1.2. Output

De snelheidsprofielen van de gevaren raaien tonen de loodrechte en parallel geprojecteerde snelheden op een rechtgetrokken theoretische raai. Daarbij wordt ook de dieptegemiddelde snelheid weergegeven door een vectorplot (zie APPENDIX D).

De figuren m.b.t. de stationaire ADCP-metingen tonen per dag de stroomsnelheid en stroomrichting in een vertikaal profiel (APPENDIX E). Enkel de periode waarbij de ADCP onder water stond wordt in het verticaal snelheidsprofiel weergegeven.

### 4.2. CTD data

#### 4.2.1. Verwerking van CTD data

Zoals in 4.1.1 reeds te lezen was, wordt de data van de CTD-Diver gebruikt voor de geluidssnelheidscorrectie van de ADCP.

De CTD's werden geplaatst aan een stationaire ADCP en een ADV op de Platen van Ossenis. Bij de verkregen data moest de druk eerst worden gecorrigeerd aan de hand van de opgemeten



luchtdruk en werd vervolgens de getijdata toegevoegd. De saliniteit werd berekend a.h.v. de temperatuur, conductiviteit en druk m.b.v. de pps-78 formule, zie APPENDIX C(Unesco, 1991).

#### **4.2.2. Output**

Er zijn weekseries gemaakt van de verwerkte data uit de CTD-Divers waarbij de saliniteit tegenover de waterstand (m TAW) is gezet. Oorspronkelijk werd de temperatuur ook toegevoegd aan de figuren maar door het regelmatig droogvallen van de toestellen en het verschil tussen dag en nacht was de trend opvallend grillig.

## 5. VOORLOPIGE ANALYSE VAN DE GEGEVENS

Onderhavige preliminaire analyse behandelt in grote lijnen de waarnemingen aan de Platen van Ossenis. Zo wordt de nadruk gelegd op enkele opmerkelijke en opvallende observaties.

### 5.1. Mobiele ADCP's

Tijdens de meetperiode van 6-8 april 2008 werden telkens dwarsstromingen opgemeten. Dit was merkbaar op alle langsraaien, en de dwarsraaien gevaren op 7 april. Algemeen kan gesteld worden dat een 15-tal minuten voor hoogwater de neer zich begint te vormen aan de oostelijke zijde van het verzonken plaatgedeelte. Een 15-tal minuten na hoogwater is deze sterk ontwikkeld. De locatie van de neer is echter veranderlijk. Op 6 april kan het neercentrum ongeveer geïdentificeerd worden op 2200 m t.o.v. het beginpunt (noordelijk gelegen) van de langsraai. De dag erna, op 7 april, is de neer meer noordelijk gelokaliseerd, nl. op 1100-1200 m van de start van de raai. Nochtans zijn de hoogwater- en laagwaterpeilen zeer vergelijkbaar. De neer waargenomen op 8 april is gelegen tussen deze van 6 en 7 april 2008.

De maximale dwarssnellheid die bij de neerevolutie optreedt, kan oplopen tot een waarde van ongeveer 1,5 m/s. De neer zwakt sterk af vanaf 45 minuten na hoogwater.

Op 7 april werden dwarsraaien gevaren ter hoogte van de neer. Ook uit deze metingen blijkt dat de neer zich ontwikkelt een 15-tal minuten voor hoogwater. De observaties tonen eveneens dat het neercentrum zich situeert ter hoogte van het einde van de helling van het verzonken plaatgedeelte aan de vaargeul. Hier werden dwarssnelheden opgemeten van meer dan 1,5 m/s.

### 5.2. Stationaire ADCP's

Twee ADCP-meettoestellen werden voor langere tijd op een vaste plaats gelokaliseerd. In dit opzicht bevond ADCP1 zich op de plaat en kwam enkel bij vloed onder water te staan, m.a.w. enkel tijdens de vloedperiode konden snelheden geregistreerd worden. Dit toestel mat maximale snelheden tot 2,2 m/s op 12 en 21 maart.

ADCP2 daarentegen bevond zich op het verzonken plaatgedeelte aan de oostelijke zijde van de Platen van Ossenis zodat deze steeds verdrongen was. Tijdens de springtijperiode van 7-12 maart 2008 werden hoge snelheden, tot 1,5 m/s, geregistreerd. Opvallend hierbij is dat gelijkaardige maximale snelheden optreden bij opeenvolgende vloed- en ebstromingen, maar dat deze bij ebstroming veel langer aanhouden. Op 21 maart werd zelfs een ebsnelheid van ongeveer 2 m/s opgemeten terwijl de vloodsnelheid beperkt bleef tot waarden onder 1,5 m/s. Tijdens de intensieve meetcampagne van 6-9 april werd een gelijkaardig snelheidspatroon waargenomen. De vloodsnelheden (>1,5 m/s) overtroffen wel deze van de ebsnelheden.

### 5.3. CTD-divers

Twee CTD-divers werden voor langere tijd op de plaat geplaatst. CTD1 was meer zuidelijk op de plaat geplaatst, in de nabijheid van de Schaar van Ossenis. CTD2 was daarentegen meer centraal, aan de oostelijke zijde van de plaat, gesitueerd.

Opvallend hierbij is dat CTD1 een hoger waterpeil registreerde tijdens de vloedperiode. Dit verschil was in de grootteorde van 10 centimeters. Met betrekking tot de saliniteit kan gesteld worden dat tijdens perioden rond doortij de saliniteit voor CTD1 lager lag dan voor CTD2. Bij springtij was de saliniteit voor CTD1 en CTD2 gelijkaardig, maar bij CTD1 was deze onregelmatiger over de vloedperiode.

## 6. REFERENTIES

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DRL (2003). Sediview Procedure Manual – Draft for July '03 Issue.

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## **APPENDIX A. MEETINSTRUMENTEN**

## A.1 Workhorse Sentinel ADCP

RD Instruments  
Acoustic Doppler Products

**WORKHORSE  
SENTINEL  
ADCP**

MARINE MEASUREMENTS  
NAVIGATION  
WATER RESOURCES

# Workhorse Sentinel

SELF-CONTAINED 1200, 600, or 300 kHz ADCP



## The global leader in high-accuracy data collection

The Sentinel is RD Instruments' most popular and versatile Acoustic Doppler Current Profiler, boasting thousands of units in operation in over 50 countries around the world.

With up to 165 meters of profiling range, the Sentinel is ideally suited for a wide variety of applications. Thanks to RDI's patented BroadBand signal processing, the Sentinel also offers unbeatable precision, with unmatched low power consumption, allowing you to collect more data over an extended period.

The lightweight and adaptable Sentinel is easily deployed on buoys, boats, or mounted on the seafloor. Real-time data can be transmitted to shore via a cable link or acoustic modem, or data can be stored internally for short or long-term deployments. The Sentinel is easily upgraded to include pressure, bottom tracking, and/or directional wave measurement—for the ultimate data collection solution.



**The Workhorse Sentinel offers:**

- *Versatility: Direct reading or self contained, moored or moving, the Sentinel provides precision current profiling data when and where you need it most.*
- *A solid upgrade path: The Sentinel has been designed to grow with your needs. Easy upgrades include pressure, bottom tracking, and directional wave measurement.*
- *Precision data: RDI's patented BroadBand signal processing delivers very low-noise data, resulting in unparalleled data resolution and minimal power consumption.*
- *A four-beam solution: RDI's patented 4-beam design improves data reliability by providing a redundant data source in the case of a blocked or damaged beam; improves data quality by delivering an independent measure known as error velocity; and improves data accuracy by reducing variance in your data.*





**RD Instruments**  
Acoustic Doppler Solutions

MEASURING WATER IN MOTION AND MOTION IN WATER



# Workhorse Sentinel

## SELF-CONTAINED 1200, 600, OR 300 kHz ADCP



### Technical Specifications

Water Profiling						
Depth	Typical Range 12m <sup>2</sup>		Typical Range 50m <sup>2</sup>		Typical Range 110m <sup>2</sup>	
Cell Size <sup>1</sup>	1200kHz		600kHz		300kHz	
Vertical Resolution	Range <sup>3</sup>	Std. Dev. <sup>4</sup>	Range <sup>3</sup>	Std. Dev. <sup>4</sup>	Range <sup>3</sup>	Std. Dev. <sup>4</sup>
0.25m	11–14m	12.9cm/s				
0.5m	13–16m	6.1cm/s	39m	12.9cm/s	see note <sup>1</sup>	
1m	14–18m	3.0cm/s	43m	6.1cm/s	92–71m	12.8cm/s
2m	15–20m <sup>2</sup>	2.0cm/s	47m	3.0cm/s	102–78m	6.1cm/s
4m	see note <sup>1</sup>		52m <sup>2</sup>	2.0cm/s	113–86m	3.0cm/s
8m					126–95m <sup>2</sup>	2.0cm/s

<sup>1</sup>User's choice of depth cell size is not limited to the typical values specified. <sup>2</sup>Longer ranges available. <sup>3</sup>Profiling range based on temperature values at 5°C and 20°C, salinity = 35ppt. <sup>4</sup>BroadBand mode single-ping standard deviation (Std. Dev.).

### Long Range Mode

	Range (m)	Depth Cell Size (m)	Std. Dev. (cm/s)
1200kHz	24	2	3.5
600kHz	70	4	3.8
300kHz	165	8	3.8

### Profile Parameters

Velocity accuracy:

- 1200, 600:  $\pm 0.25\%$  of the water velocity relative to the ADCP  $\pm 0.25\text{cm/s}$
- 300:  $\pm 0.5\%$  of the water velocity relative to the ADCP  $\pm 0.5\text{cm/s}$

Velocity resolution: 0.1cm/s

Velocity range:  $\pm 5\text{m/s}$  (default)  
 $\pm 20\text{m/s}$  (maximum)

Number of depth cells: 1–128

Ping rate: 2Hz (typical)

### Echo Intensity Profile

Vertical resolution: Depth cell size  
Dynamic range: 80dB  
Precision:  $\pm 1.5\text{dB}$  (relative measure)

### Transducer and Hardware

Beam angle: 20°

Configuration: 4-beam, convex

Internal memory: Two PCMCIA card slots; one memory card included

Communications: Serial port selectable by switch for RS-232 or RS-422. ASCII or binary output at 1200–115,400 baud.

### Standard Sensors

Temperature (mounted on transducer):

Range: -5° to 45°C

Precision:  $\pm 0.4^\circ\text{C}$

Resolution: 0.01°

Tilt:

Range:  $\pm 15^\circ$

Accuracy:  $\pm 0.5^\circ$

Precision:  $\pm 0.5^\circ$

Resolution: 0.01°

Compass (fluxgate type, includes built-in field calibration feature):

Accuracy:  $\pm 2^\circ$  <sup>4</sup>

Precision:  $\pm 0.5^\circ$  <sup>4</sup>

Resolution: 0.01°

Maximum tilt:  $\pm 15^\circ$

<sup>4</sup>@ 60° magnetic dip angle, 0.5G total field

### Power

DC Input: 20–60VDC; internal battery pack, external battery pack, or external power supply

Voltage: 42VDC new; 28VDC depleted

Capacity: @ 0°C: 400 watt hours

Transmit:

- 16W @ 35V (1200kHz)
- 37W @ 35V (600kHz)
- 115W @ 35V (300kHz)

### Environmental

Standard depth rating:

200m; optional to 6000m

Operating temperature: -5° to 45°C

Storage temperature: -30° to 75°C

Weight in air: 13.0kg

Weight in water: 4.5kg

### Software

Use RDI's Windows™-based software for the best results:

- WinSC—Data Acquisition
- WinADCP—Data Display and Export

### Upgrades Available

- Memory: Up to 2 gigabytes
- Pressure sensor
- External battery case
- High-resolution water-profiling modes
- Bottom tracking
- AC/DC power converter, 48VDC output
- Pressure cases for depths up to 6000m

### Dimensions



**RD Instruments**  
Acoustic Doppler Solutions  
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Specifications subject to change without notice; Rev. 0104

## A.2 CTD-Diver

# CTD-Diver datalogger



### Applications

- Aquifer recharge projects
- Saltwater intrusion projects
- Surveillance against (illegal) discharges
- Surveillance on waste disposal sites
- Monitoring groundwater or surface water quality

**CTD-Diver: reliable in all conditions**

Where there is a need to monitor not only groundwater levels but also salinization, saltwater intrusion or contamination in the case of (illegal) discharges and landfill sites, the CTD-Diver is the instrument of choice. Besides a pressure and temperature sensor, the CTD-Diver has a four-electrode conductivity sensor for determining conductivity across a substantial measurement range (0-80 mS/cm). For each measurement, the date and time, groundwater level, temperature and conductivity are recorded. There are two options for conductivity measurement: display the measured conductivity or a specific conductivity at 25 °C. The CTD-Diver is accommodated in a ceramic casing which is resistant to corrosive conditions. The CTD-Diver has a memory with a maximum storage capacity of 16,000 measurement data per parameter.

#### Specifications:

Dimensions	Ø22 mm x 168 mm
Memory	16,000 measurements (non-volatile)
Sample rate <sup>→</sup>	0.5 sec to 99 hours
Housing material	ceramic (ZrO <sub>2</sub> )
Temperature range	-20 °C to 80 °C
- accuracy	±0.1 °C
- resolution	0.01 °C
Conductivity:	
- range	0 to 80 mS/cm
- accuracy	±1% of reading
- resolution	0.1% of reading
Battery life	10 years (depending on use)
Weight	150 grams



#### Highlights:

- 3 year warranty
- Long-term and frequent measurements
- Various measurement methods:
  - fixed
  - event dependent
  - pumping tests
- Simple calibration
- Temperature corrected measurement
- Reliable and accurate measurement data
- Compact size
- Robust construction:
  - ceramic
  - corrosion resistant
- Measures three parameters:
  - conductivity
  - temperature
  - pressure



#### CTD-Diver® Technical specifications (pressure)

Type	D1 261	D1 263	D1 265	D1 900 (Baro)
Range	10 m H <sub>2</sub> O	30 m H <sub>2</sub> O	100 m H <sub>2</sub> O	1.5 m H <sub>2</sub> O
- accuracy <sup>→</sup>	1 cm H <sub>2</sub> O	3 cm H <sub>2</sub> O	10 cm H <sub>2</sub> O	0.5 cm H <sub>2</sub> O
- resolution	0.2 cm H <sub>2</sub> O	0.6 cm H <sub>2</sub> O	2 cm H <sub>2</sub> O	0.1 cm H <sub>2</sub> O

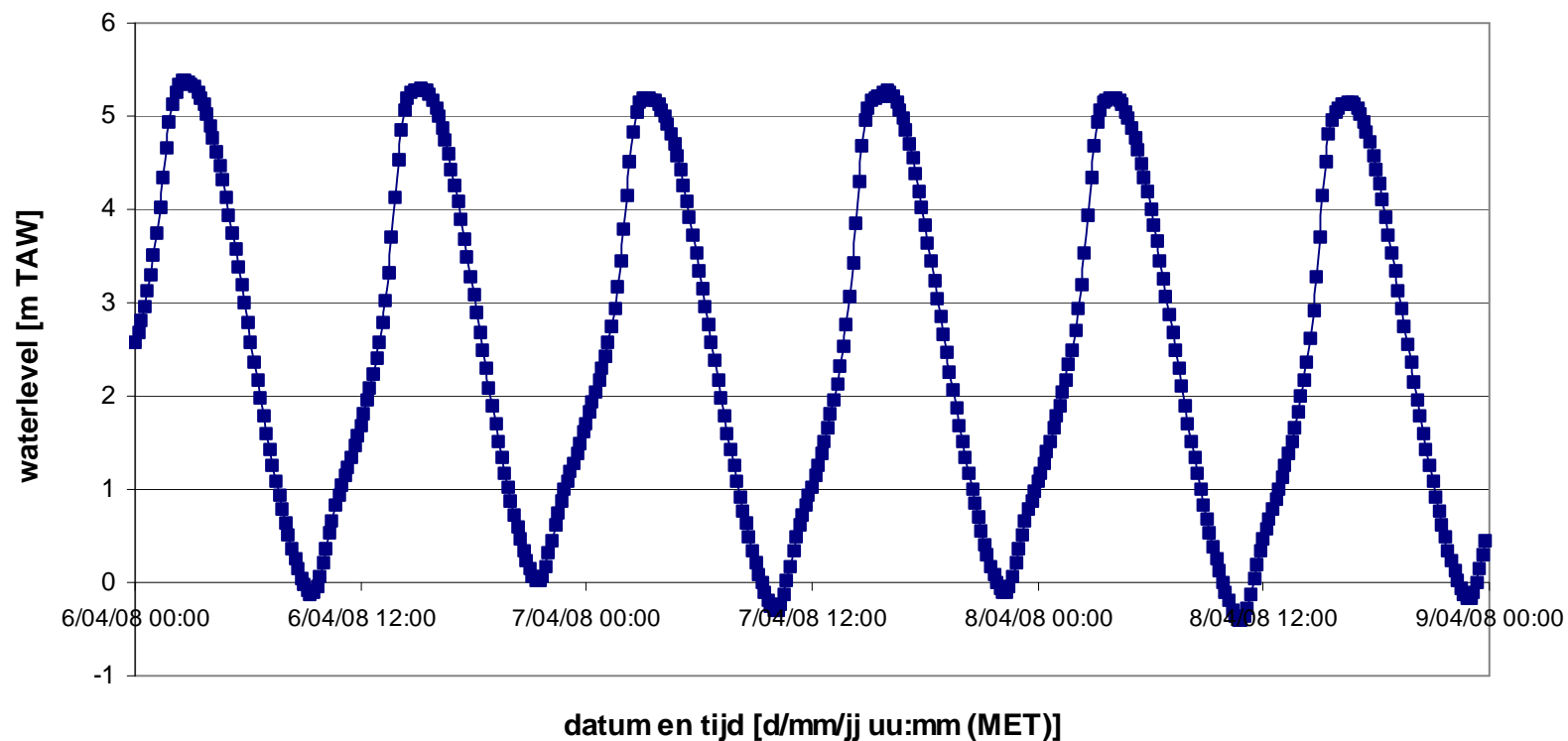
<sup>→</sup> various measuring methods available (fixed, event based and pumping tests)

<sup>→</sup> within temperature compensated range (0°C to 40°C)

## **APPENDIX B.    GETIJDATA**



## 11313 Factual data report maart/april 2008



Getij op 06-07-08/04/2008

Source BMM (2008)

Location:

Hansweert

Date:

06-07-08/04/2008

I/RA/11313/08.045/YDK

**APPENDIX C.**

**UNESCO PPS-78 FORMULE VOOR DE BEREKENING**

**VAN SALINITEIT**

**Practical Salinity Scale (PPS 78) Salinity in the range of 2 to 42**

Constants from the 19th Edition of Standard Methods

R cond.ratio	0.0117	$R = \frac{C}{42.914\text{mS/cm}}$							
C Cond at t	0.5	Input conductivity in mS/cm of sample							
t deg. C	22.00	Input temperature of sample solution							
P dBar	20	Input pressure at which sample is measured in decibars							
Rp	1.0020845	$R_p = 1 + \frac{p(e_1 + e_2p + e_3p^2)}{1 + d_1t + d_2t^2 + (d_3 + d_4t)R}$							
rt	1.1641102	$r_t = c_0 + c_1t + c_2t^2 + c_3t^3 + c_4t^4$							
Rt	0.0099879	$R_t = \frac{R}{R_p \times r_t}$							
Delta S	-0.0010	$\text{Delta S} = \frac{(t-15)}{1+k(t-15)} (b_0 + b_1R_t^{1/2} + b_2R_t + b_3R_t^{3/2} + b_4R_t^2 + b_5R_t^{5/2})$							
S = Salinity	0.257	$S = a_0 + a_1R_t^{1/2} + a_2R_t + a_3R_t^{3/2} + a_4R_t^2 + a_5R_t^{5/2} + \text{delta S}$							
a0	0.0080	b0	0.0005	c0	0.6766097	d1	3.426E-02	e1	2.070E-04
a1	-0.1692	b1	-0.0056	c1	2.00564E-02	d2	4.464E-04	e2	-6.370E-08
a2	25.3851	b2	-0.0066	c2	1.104259E-04	d3	4.215E-01	e3	3.989E-12
a3	14.0941	b3	-0.0375	c3	-6.9698E-07	d4	-3.107E-03		
a4	-7.0261	b4	0.0636	c4	1.0031E-09				
a5	2.7081	b5	-0.0144						
		k	0.0162						

R = ratio of measured conductivity to the conductivity of the Standard Seawater Solution

Conductivity Ratio R is a function of salinity, temperature, and hydraulic pressure. So that we can factor R into three parts i.e.

$$R = R_t \times R_p \times r_t$$

$$R = C(S, t, p) / C(35, 15, 0)$$

C = 42.914 mS/cm at 15 deg C and 0 dbar pressure ie C(35,15,0) where 35 is the salinity

Ocean pressure is usually measured in decibars. 1 dbar =  $10^{-1}$  bar =  $10^5$  dyne/cm<sup>2</sup> =  $10^4$  Pascal.

## **APPENDIX D.**

### **SNELHEIDSPROFIEL (MOBIELE ADCP)**

## **D.1 Langsraai 06/04/08**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

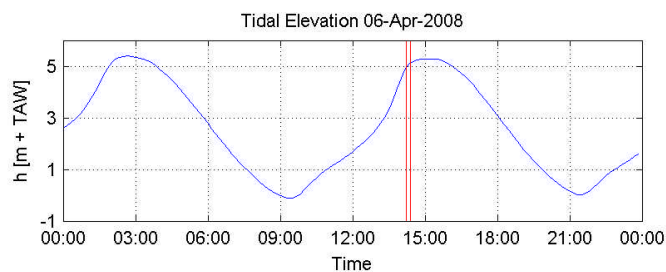
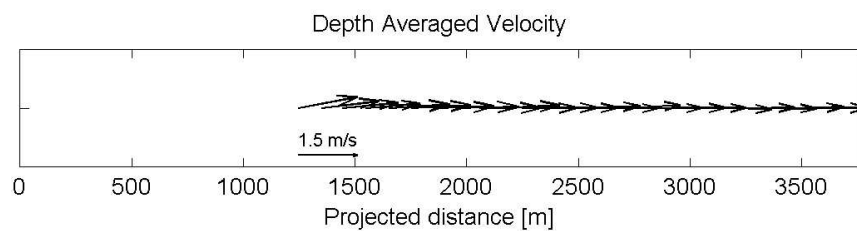
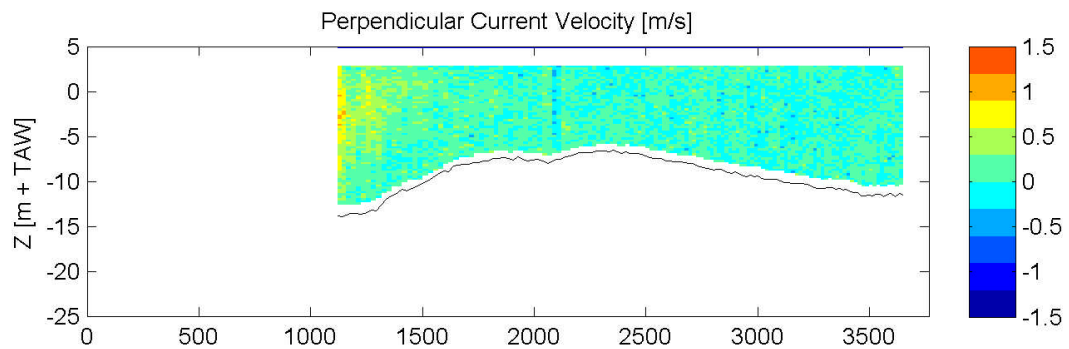
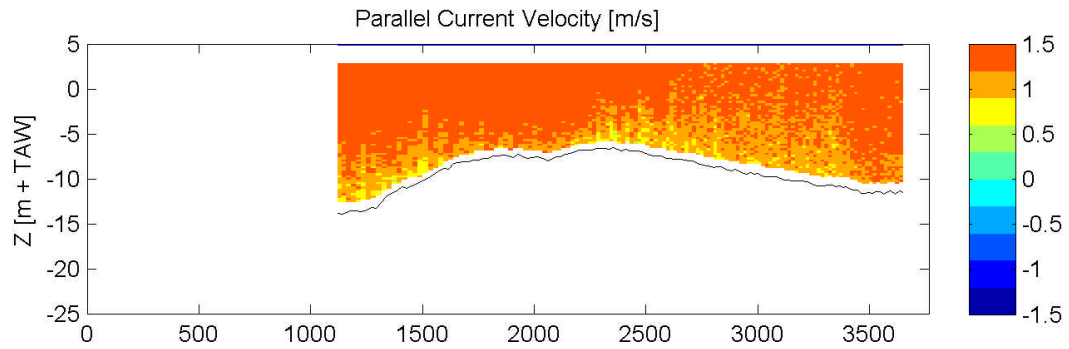
ADCP

Sourcefile:

0381001.csv

Location:

Zuidergat langsraai



HW/LW:

02:40: h = 5.39 m+TAW

09:20: h = -0.12 m+TAW

15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

14:14 - 14:22

Time after HW [HH:MM]

-0:51

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

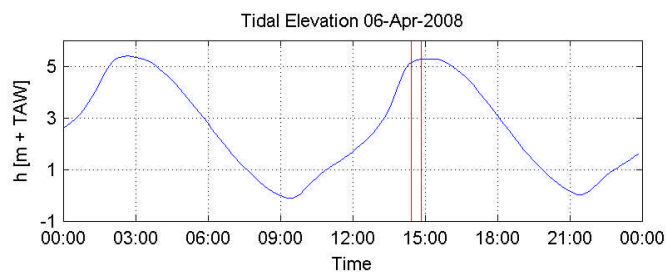
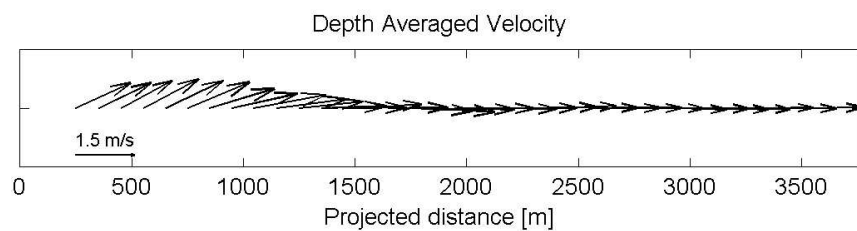
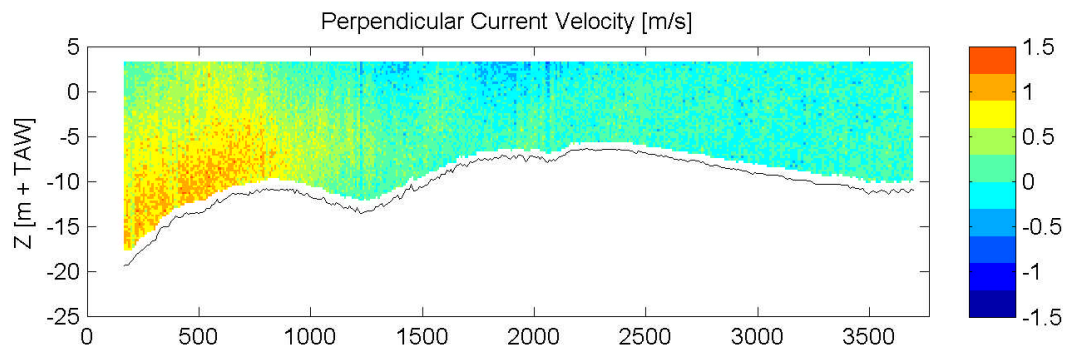
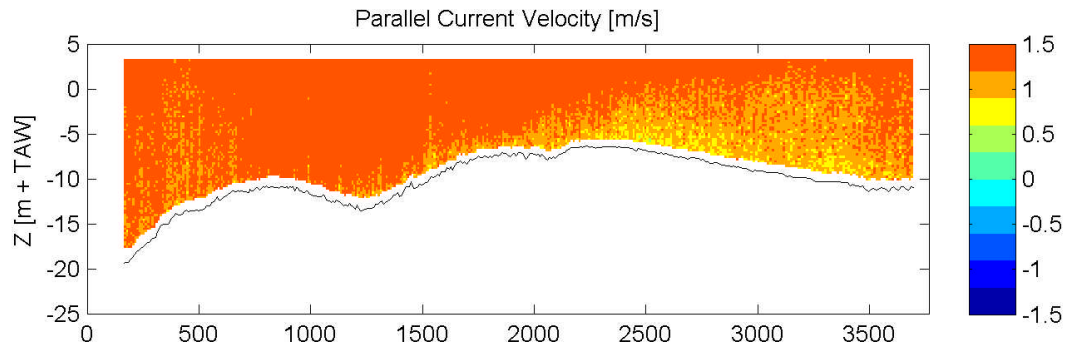
ADCP

Sourcefile:

0381002.csv

Location:

Zuidergat langsraai



HW/LW: 02:40: h = 5.39 m+TAW  
09:20: h = -0.12 m+TAW  
15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

14:49 - 14:24

Time after HW [HH:MM]

-0:32

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

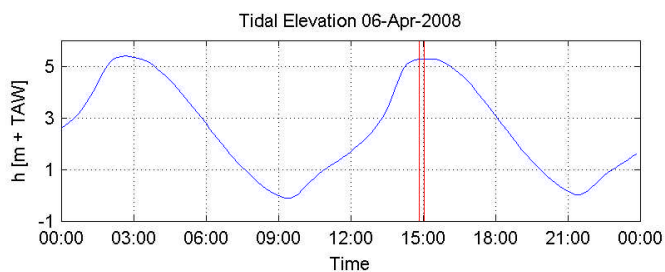
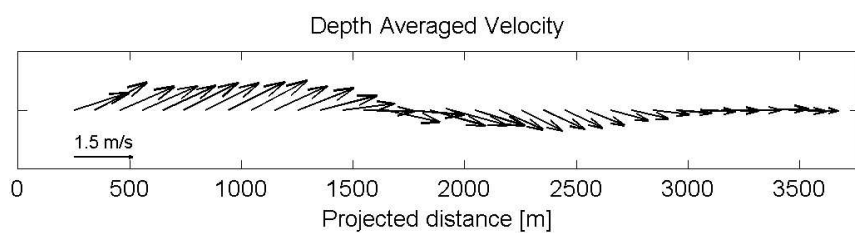
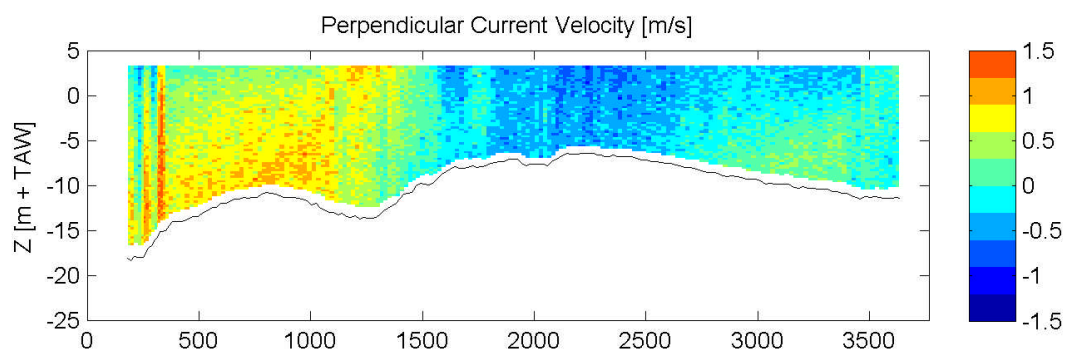
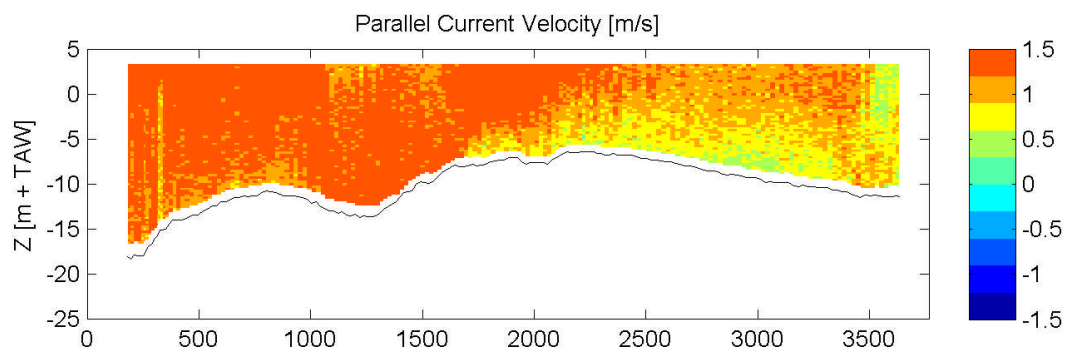
ADCP

Sourcefile:

0381003.csv

Location:

Zuidergat langsraai



HW/LW: 02:40: h = 5.39 m+TAW  
09:20: h = -0.12 m+TAW  
15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

14:50 - 15:02

Time after HW [HH:MM]

-0:13

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

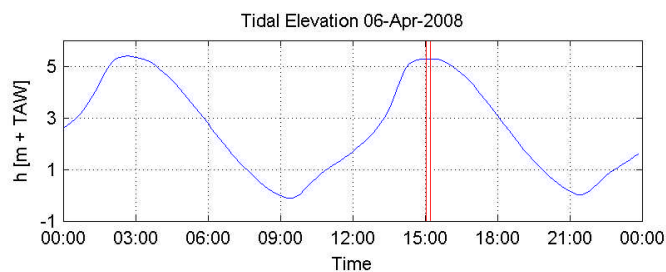
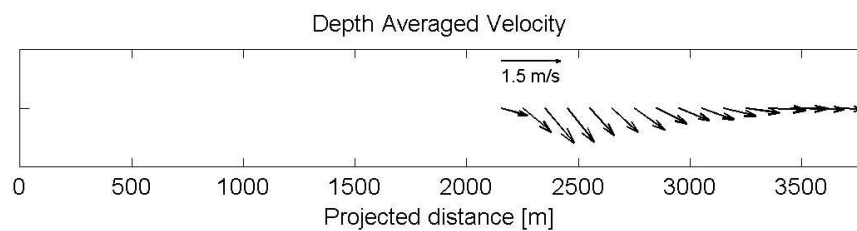
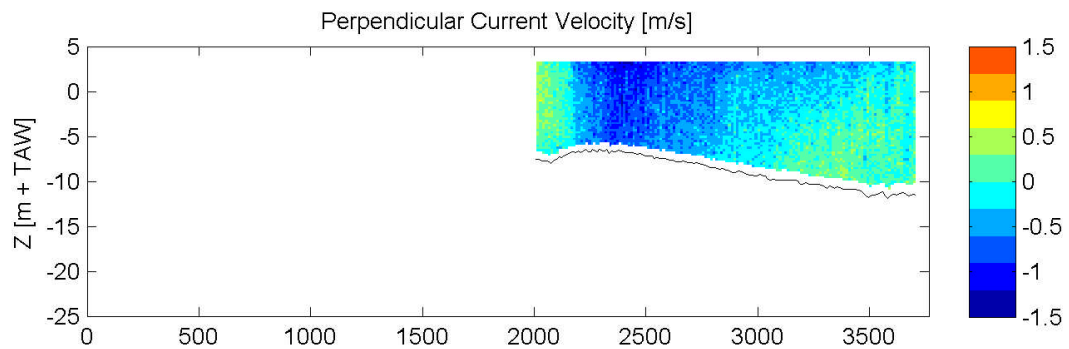
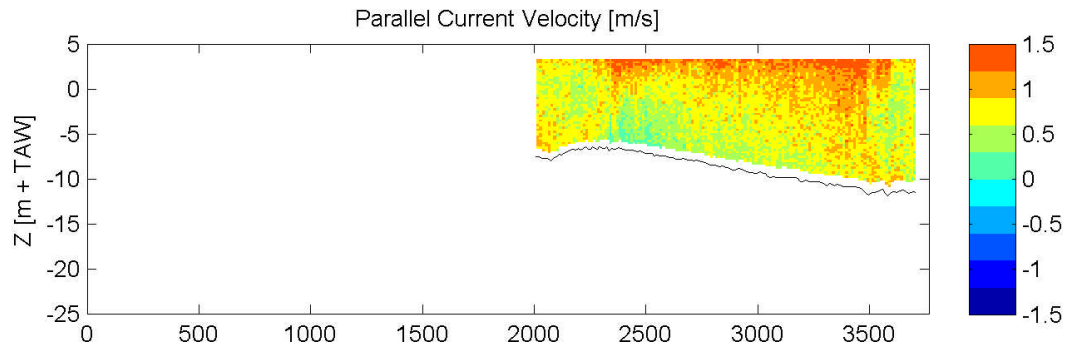
ADCP

Sourcefile:

0381004.csv

Location:

Zuidergat langsraai



HW/LW: 02:40: h = 5.39 m+TAW  
09:20: h = -0.12 m+TAW  
15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

15:12 - 15:03

Time after HW [HH:MM]

-0:02

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

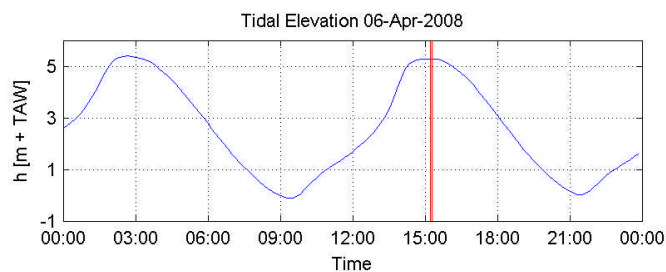
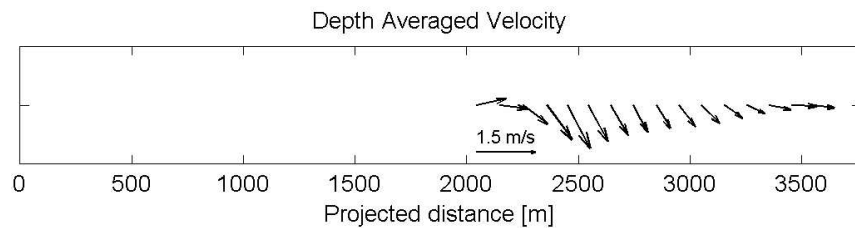
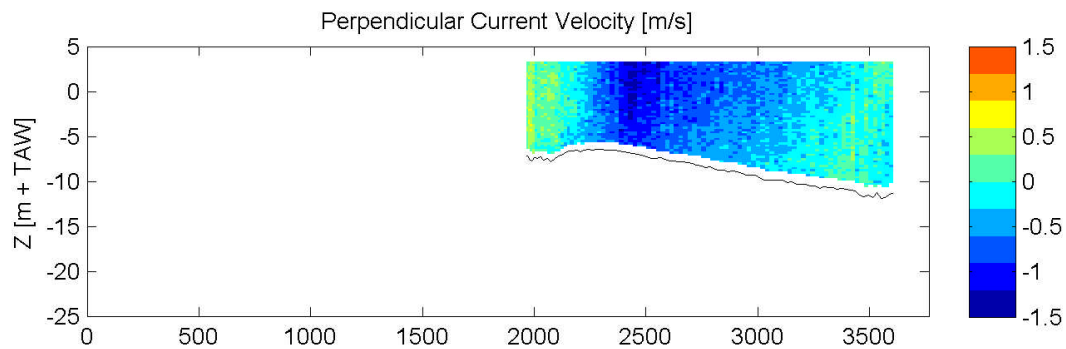
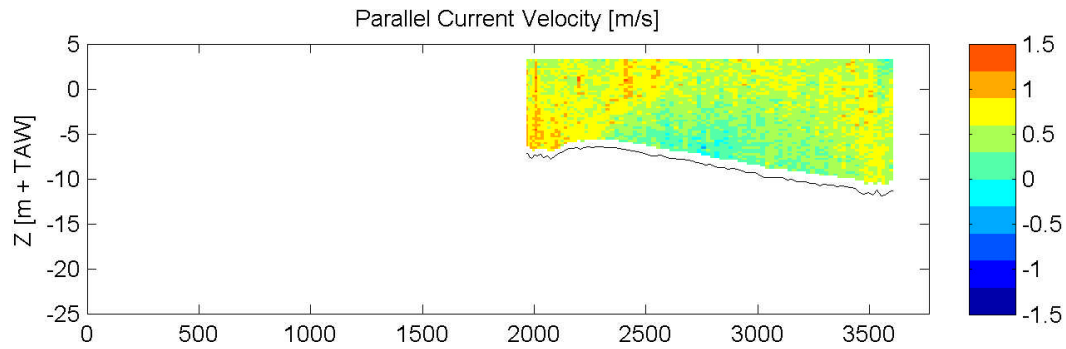
ADCP

Sourcefile:

0381005.csv

Location:

Zuidergat langsraai



HW/LW: 02:40: h = 5.39 m+TAW  
09:20: h = -0.12 m+TAW  
15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

15:12 - 15:18

Time after HW [HH:MM]

0:05

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

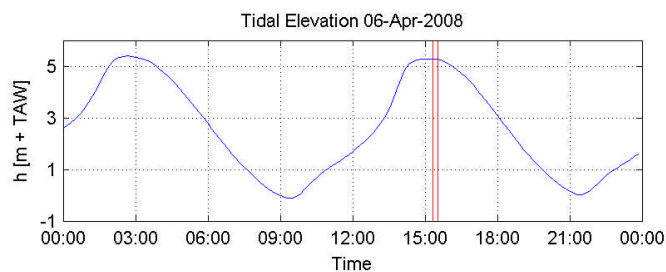
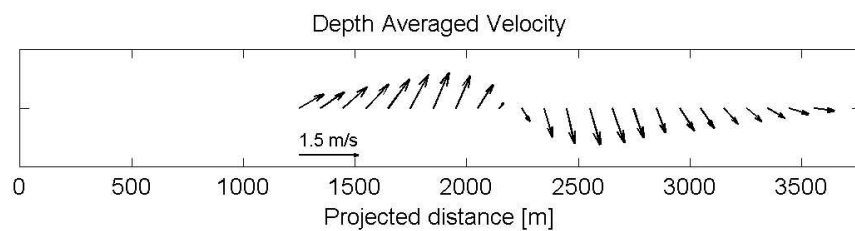
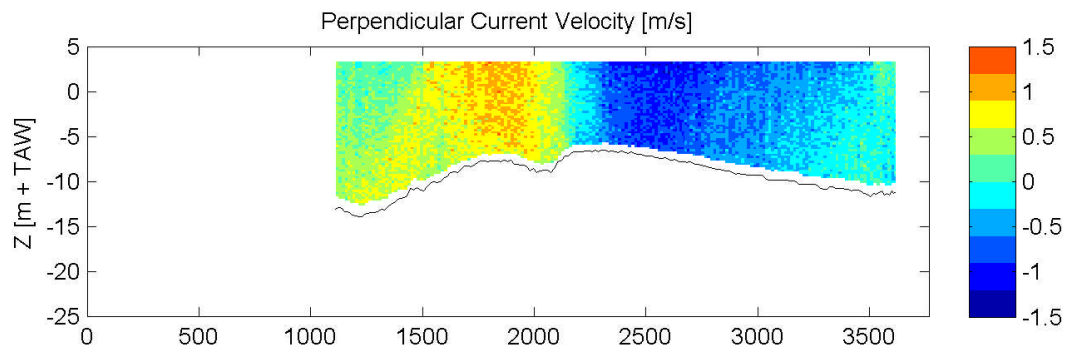
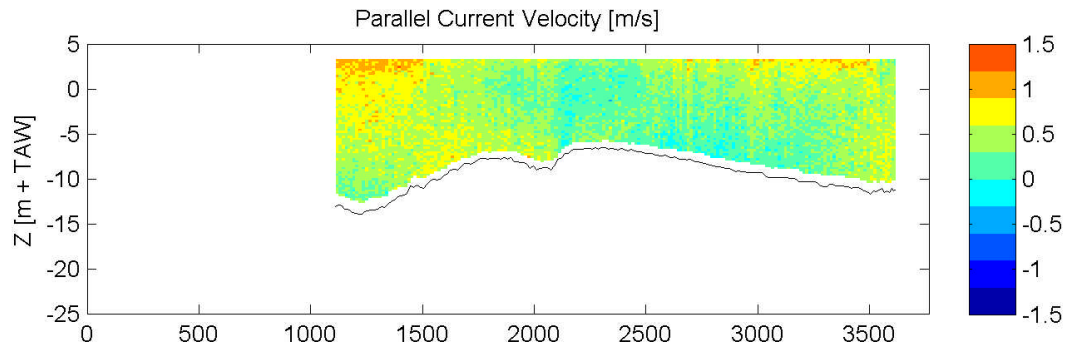
ADCP

Sourcefile:

0381006.csv

Location:

Zuidergat langsraai



HW/LW: 02:40: h = 5.39 m+TAW  
09:20: h = -0.12 m+TAW  
15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

15:31 - 15:19

Time after HW [HH:MM]

0:15

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

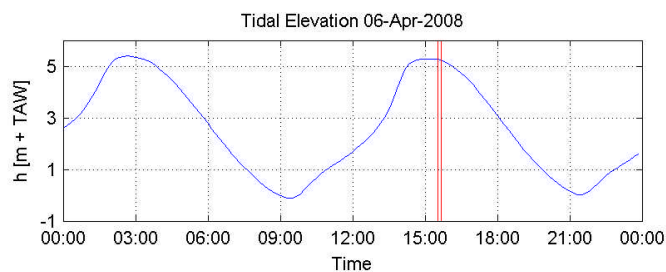
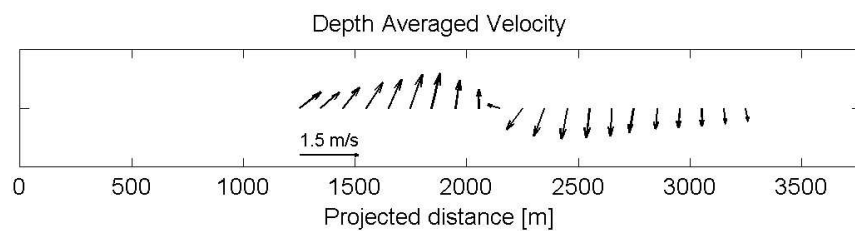
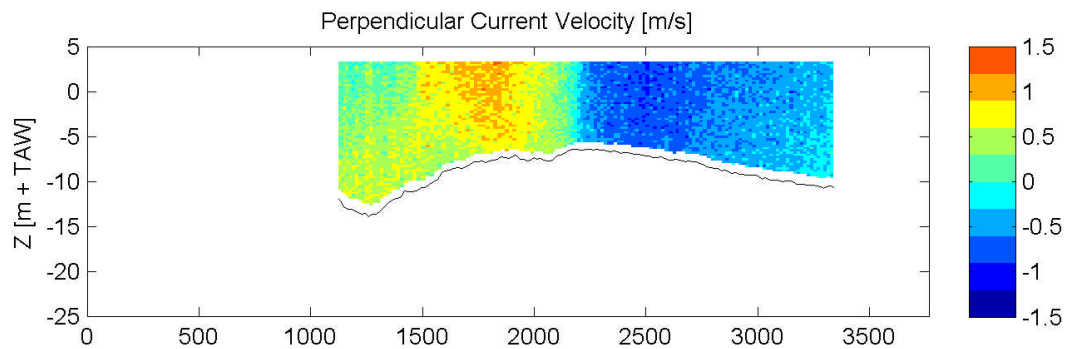
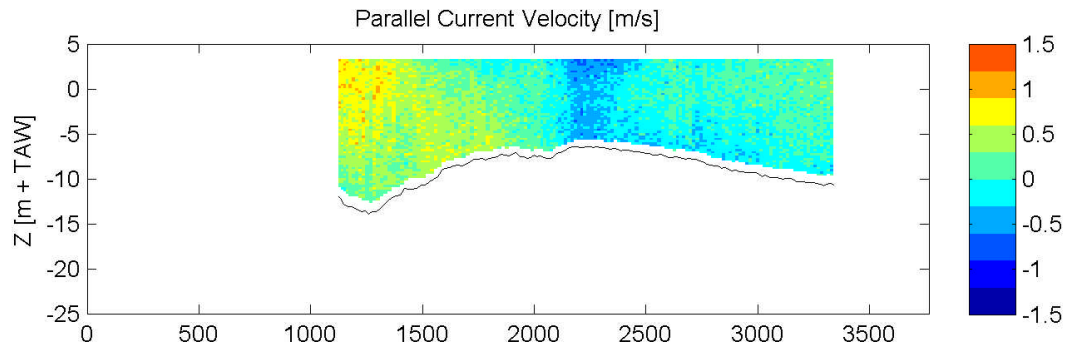
ADCP

Sourcefile:

0381007.csv

Location:

Zuidergat langsraai



HW/LW:

02:40: h = 5.39 m+TAW  
09:20: h = -0.12 m+TAW  
15:10: h = 5.29 m+TAW

Date / Time [MET] :

06-Apr-2008

15:32 - 15:41

Time after HW [HH:MM]

0:26

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

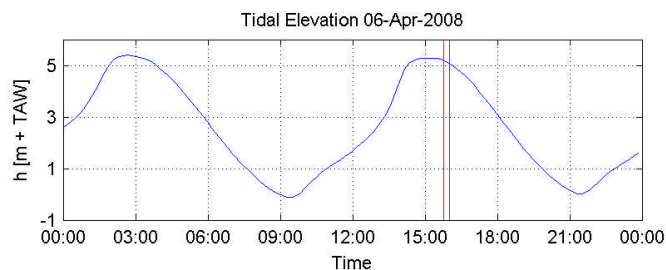
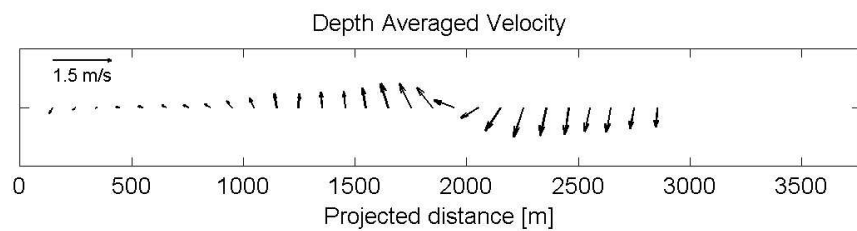
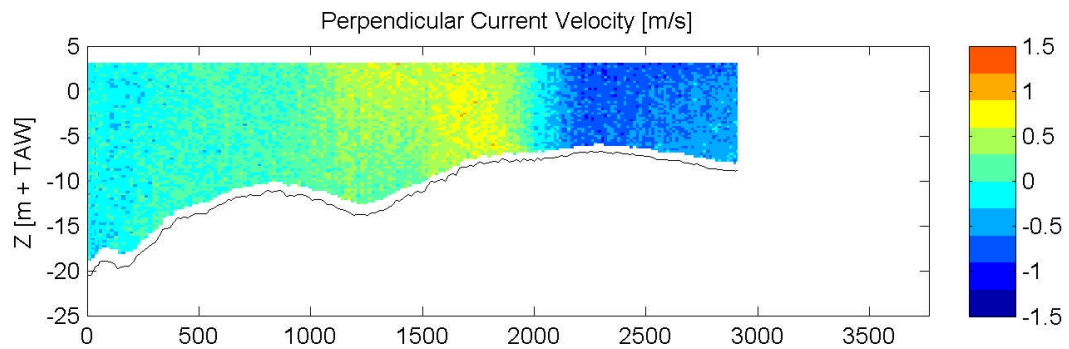
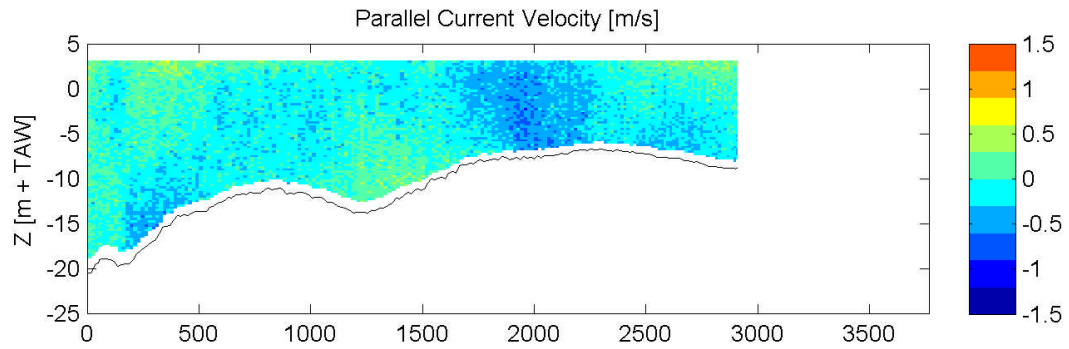
ADCP

Sourcefile:

0381008.csv

Location:

Zuidergat langsraai



HW/LW:

02:40: h = 5.39 m+TAW

09:20: h = -0.12 m+TAW

15:10: h = 5.29 m+TAW

Date / Time [MET]:

06-Apr-2008

16:00 - 15:47

Time after HW [HH:MM]

0:43

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

## **D.2 Langsraai 07/04/08**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

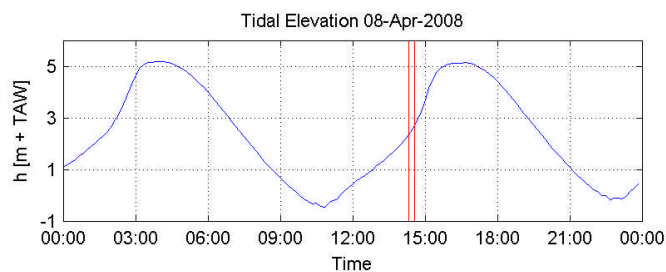
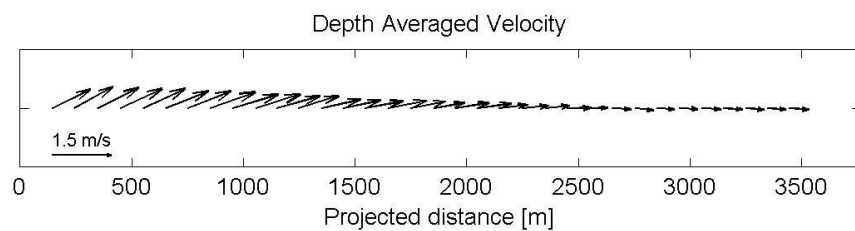
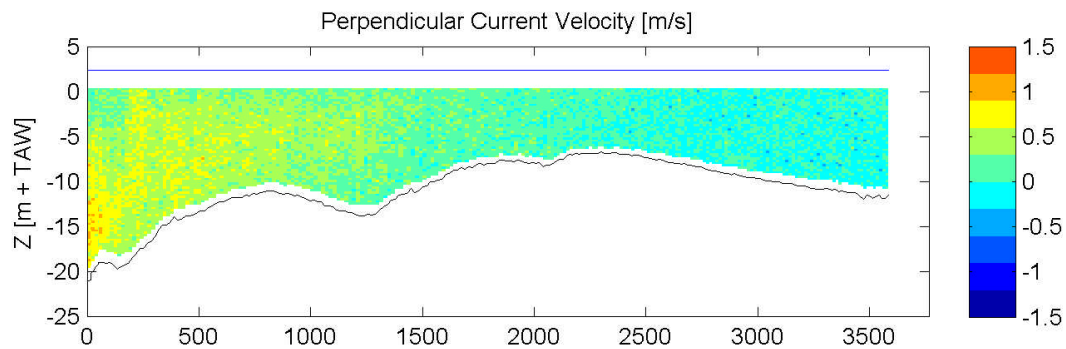
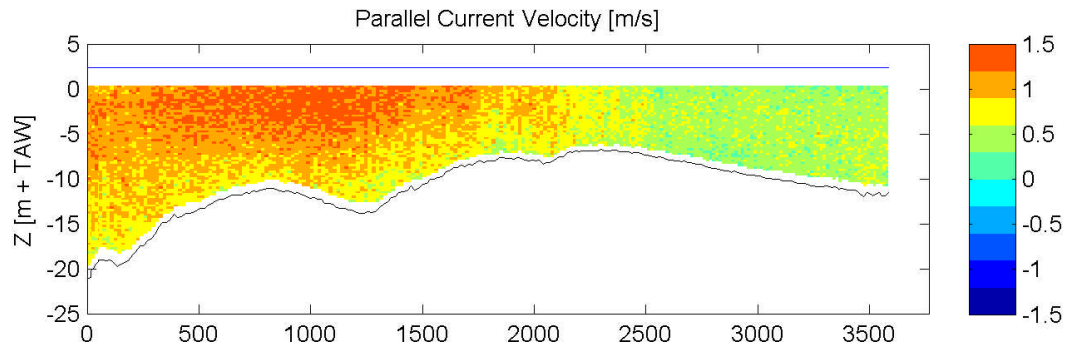
ADCP

Sourcefile:

0381027.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

14:19 - 14:34

Time after HW [HH:MM]

-2:13

Data Processed by:



In association with:

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

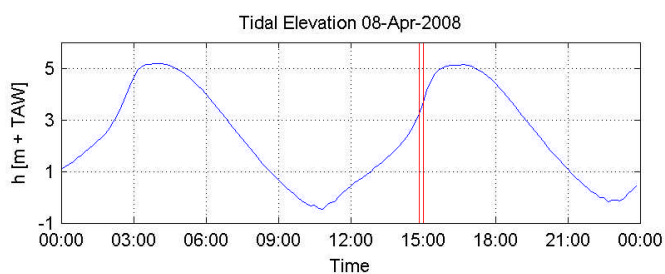
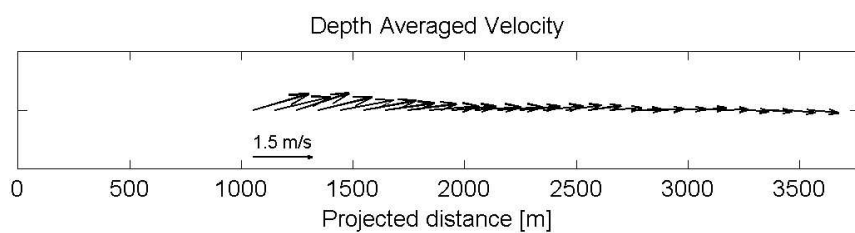
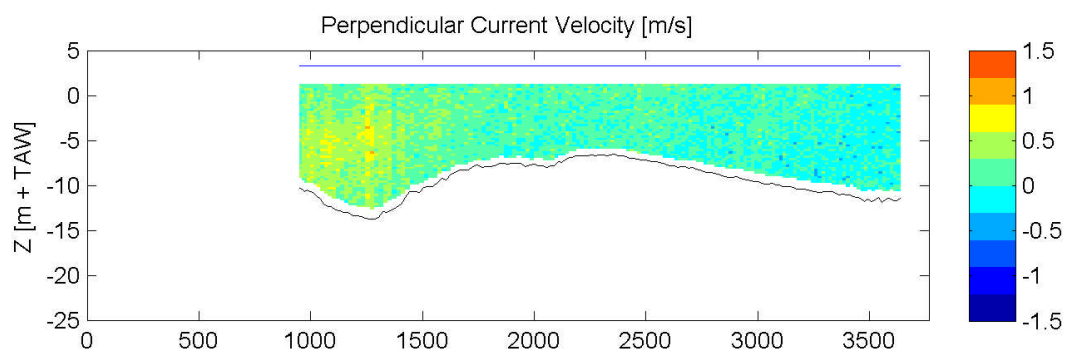
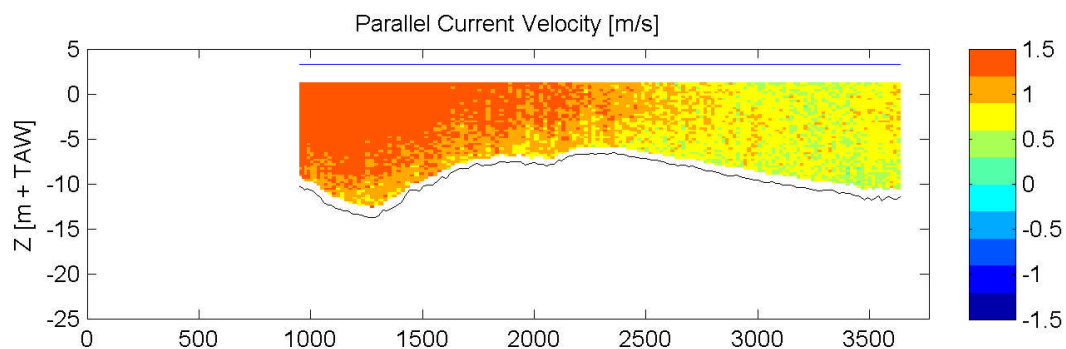
ADCP

Sourcefile:

0381029.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

14:50 - 15:00

Time after HW [HH:MM]

-1:44

Data Processed by:



In association with:

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

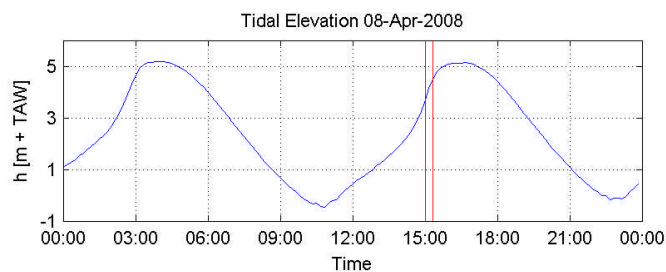
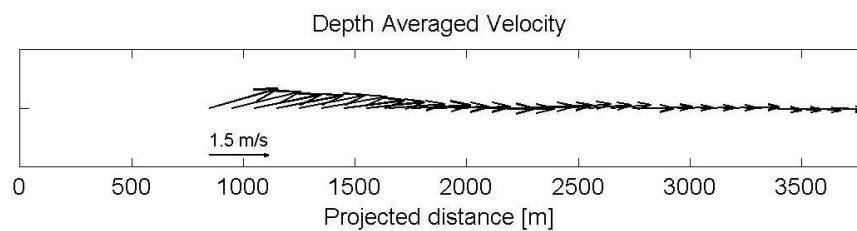
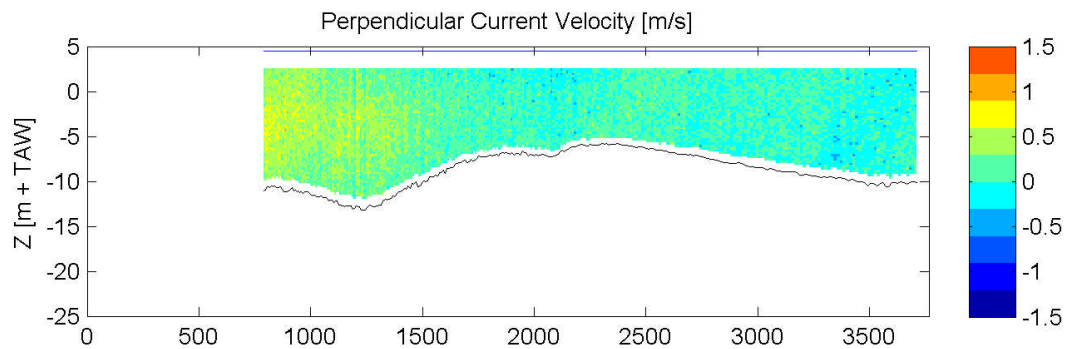
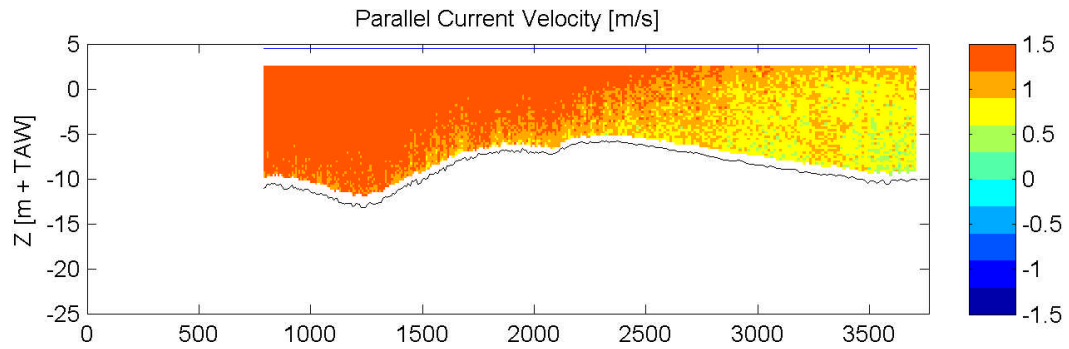
ADCP

Sourcefile:

0381030.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:19 - 15:00

Time after HW [HH:MM]

-1:29

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

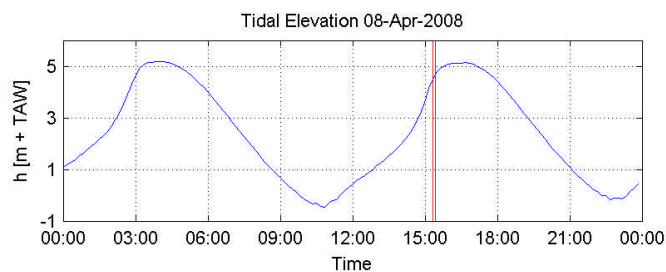
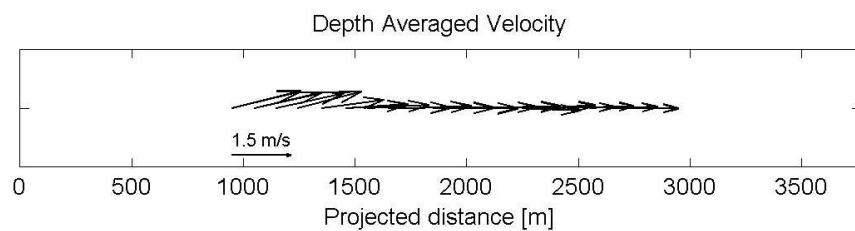
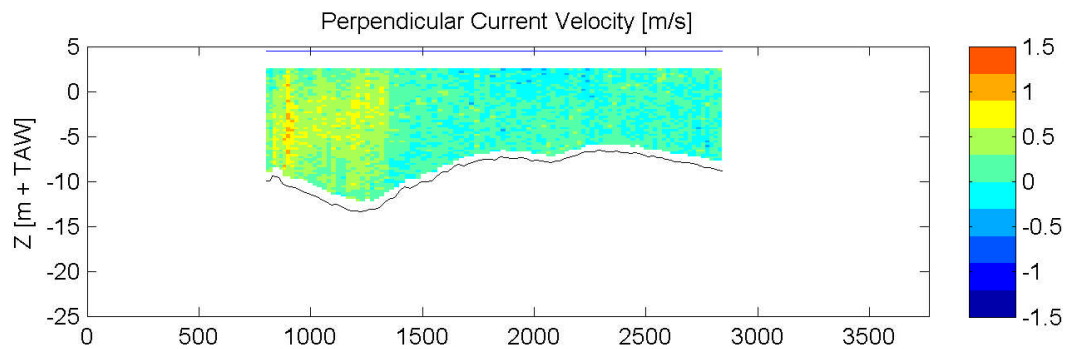
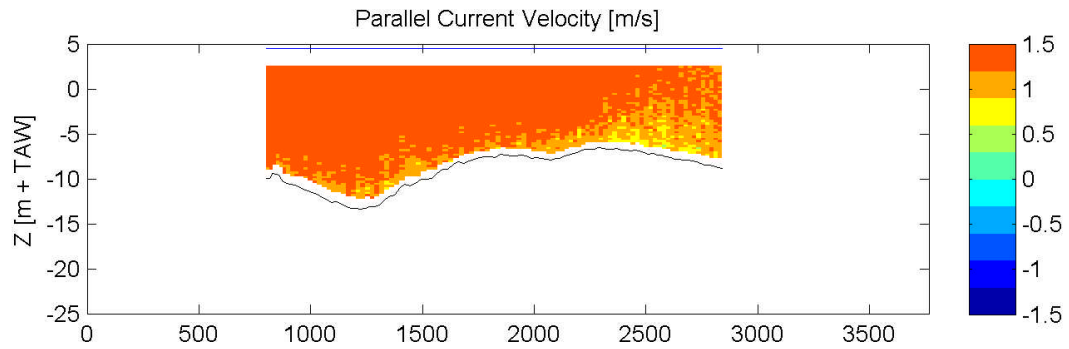
ADCP

Sourcefile:

0381031.csv

Location:

Zuidergat langsraai



HW/LW:

04:00: h = 5.17 m+TAW

10:50: h = -0.46 m+TAW

16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:19 - 15:26

Time after HW [HH:MM]

-1:16

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

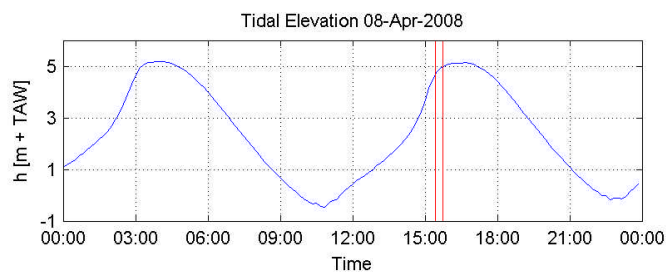
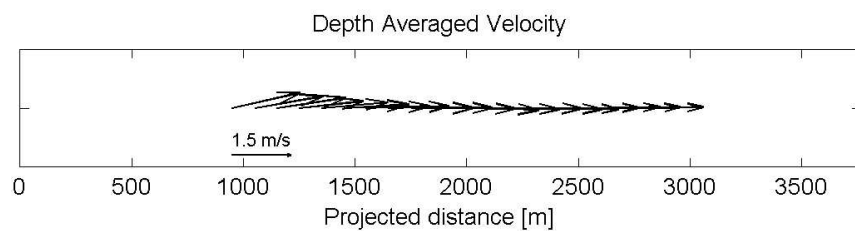
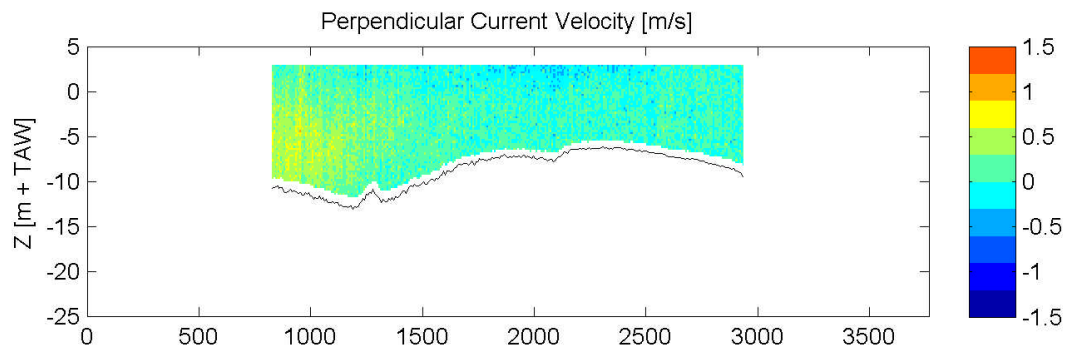
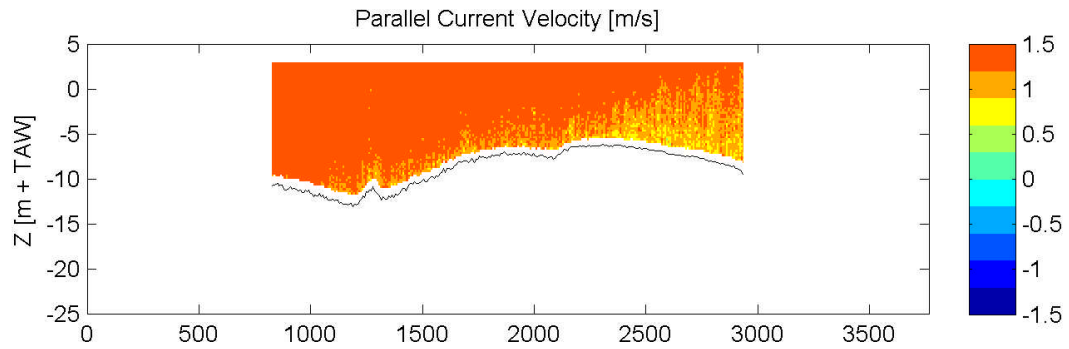
ADCP

Sourcefile:

0381032.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:44 - 15:26

Time after HW [HH:MM]

-1:04

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

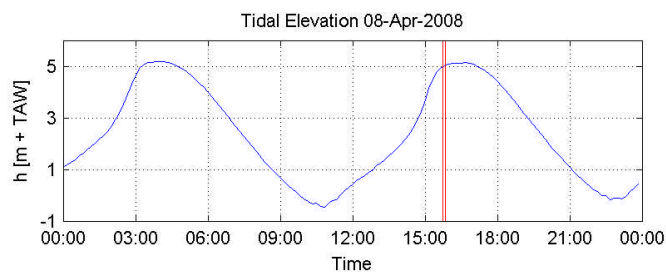
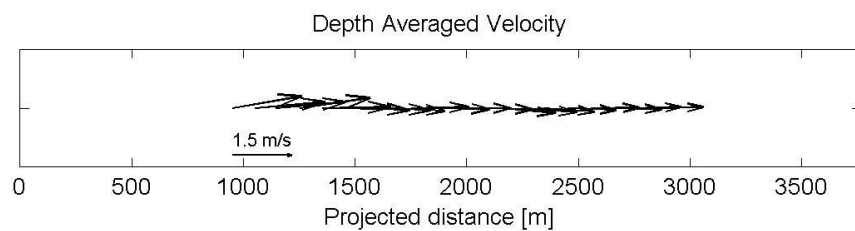
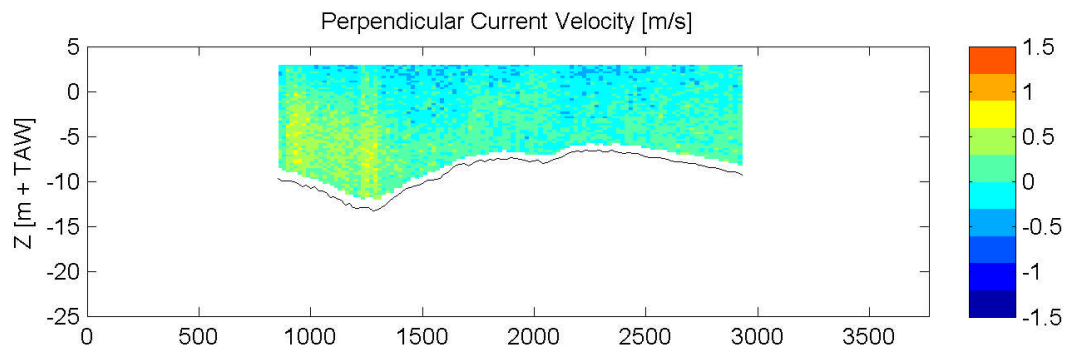
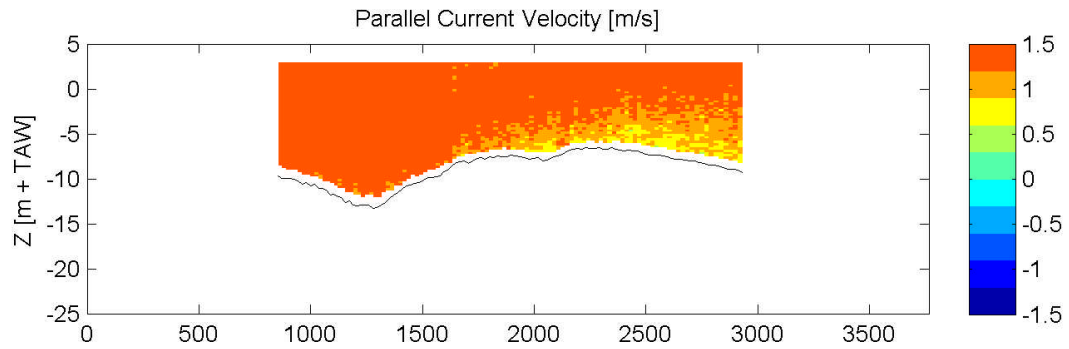
ADCP

Sourcefile:

0381033.csv

Location:

Zuidergat langsraai



HW/LW:

04:00: h = 5.17 m+TAW

10:50: h = -0.46 m+TAW

16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:44 - 15:51

Time after HW [HH:MM]

-0:51

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

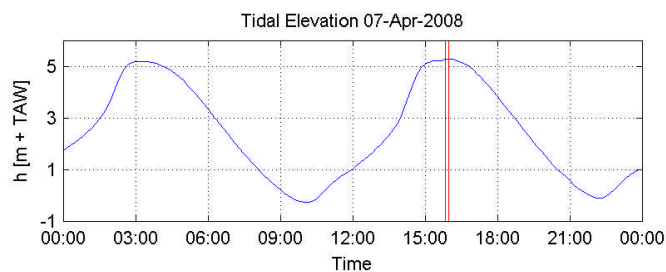
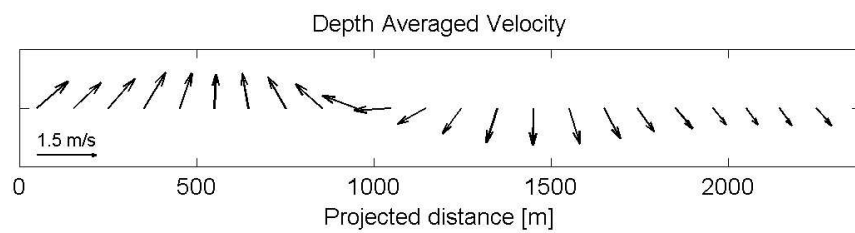
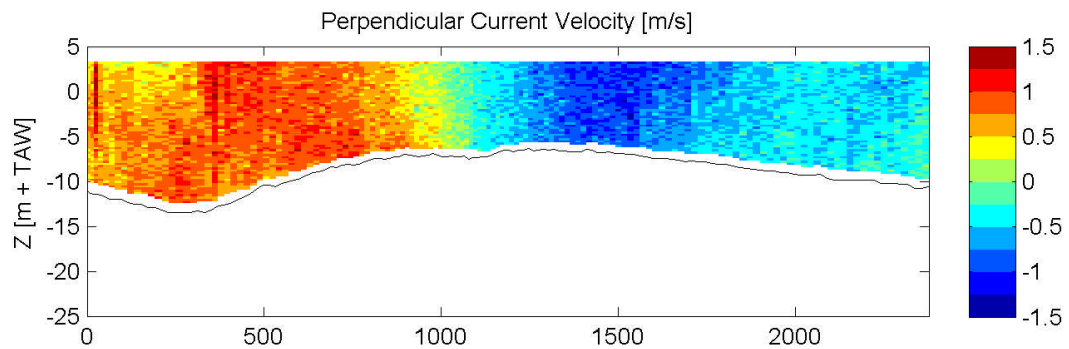
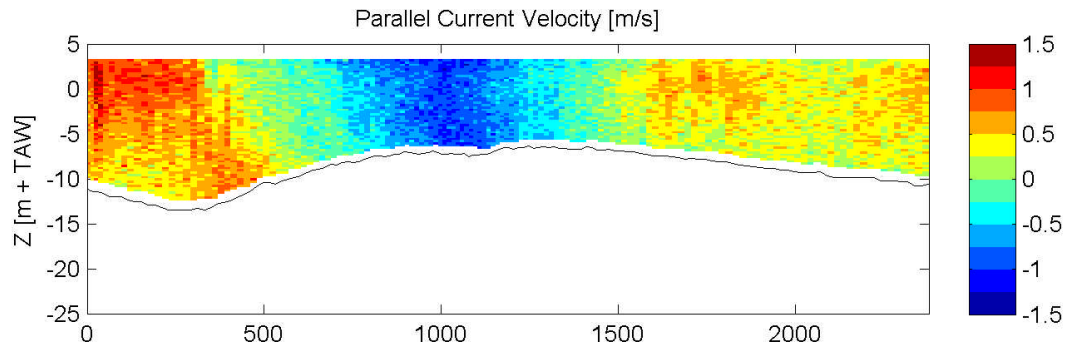
ADCP

Sourcefile:

0381021.csv

Location:

Zuidergat langsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:50 - 15:59

Time after HW [HH:MM]

-0:04

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

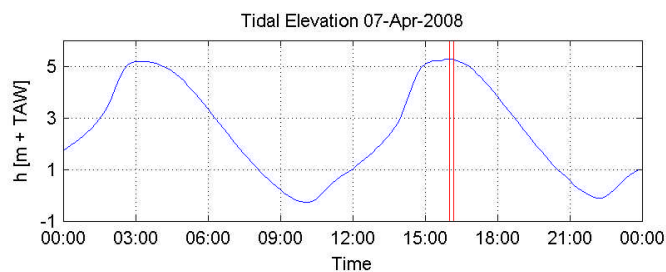
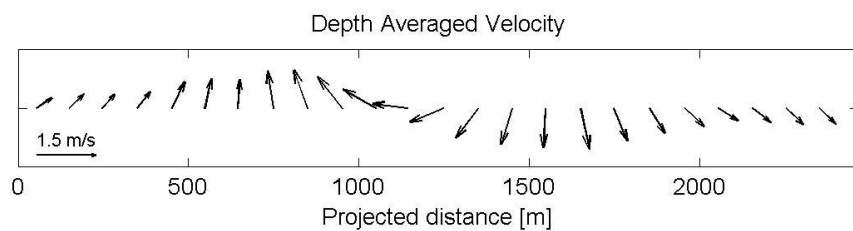
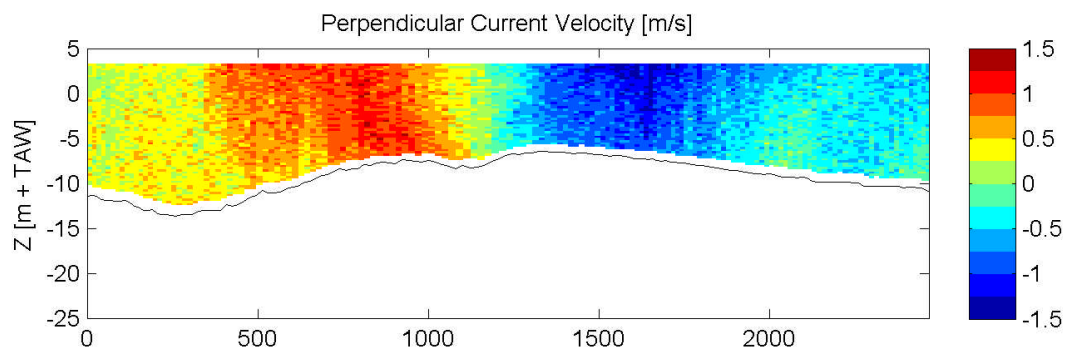
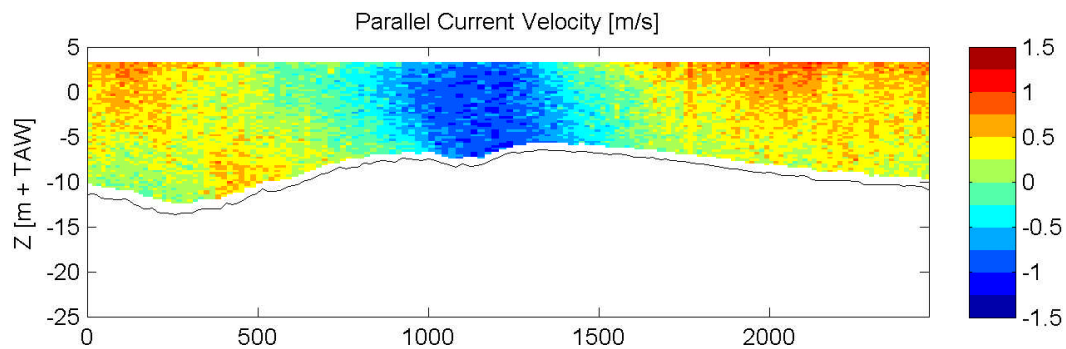
ADCP

Sourcefile:

0381022.csv

Location:

Zuidergat langsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:10 - 16:00

Time after HW [HH:MM]

0:05

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

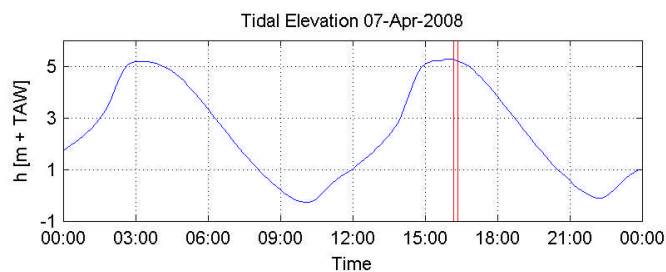
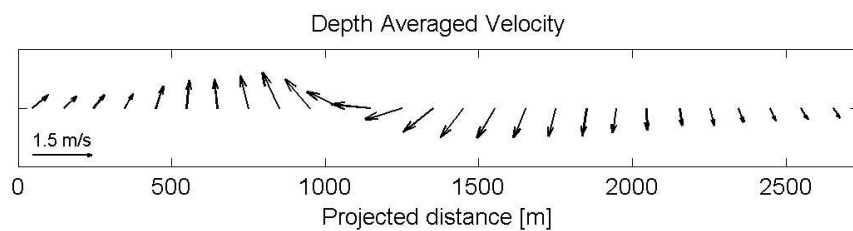
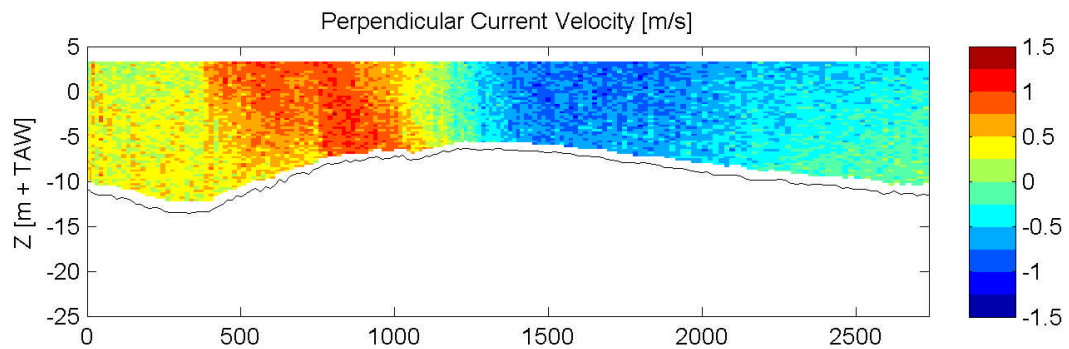
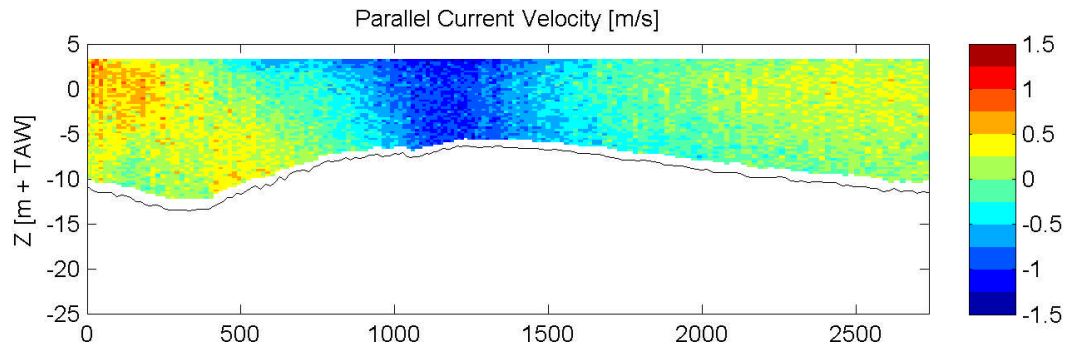
ADCP

Sourcefile:

0381023.csv

Location:

Zuidergat langsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:11 - 16:22

Time after HW [HH:MM]

0:16

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

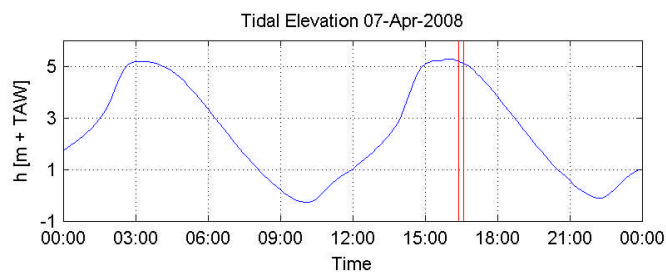
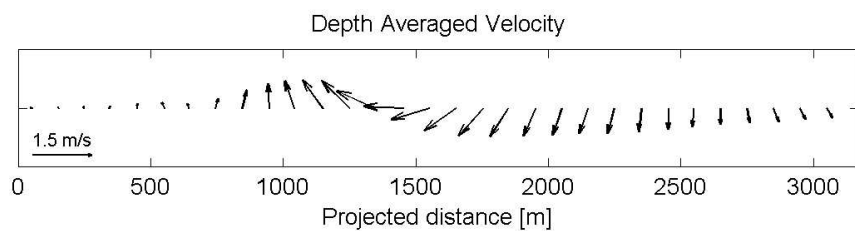
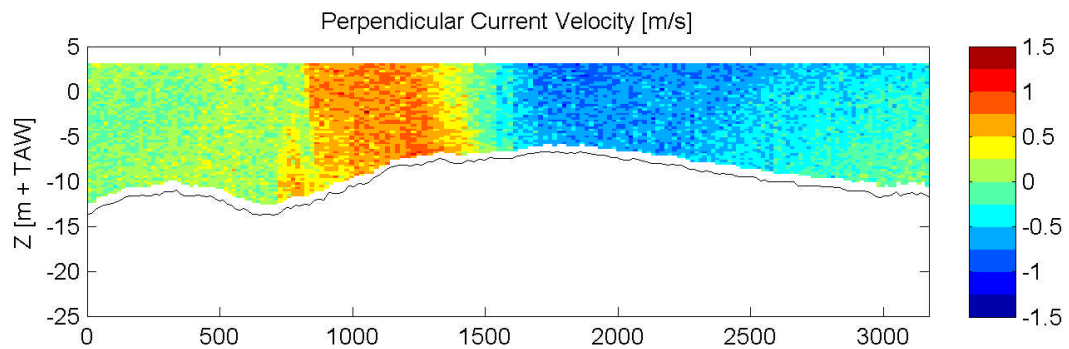
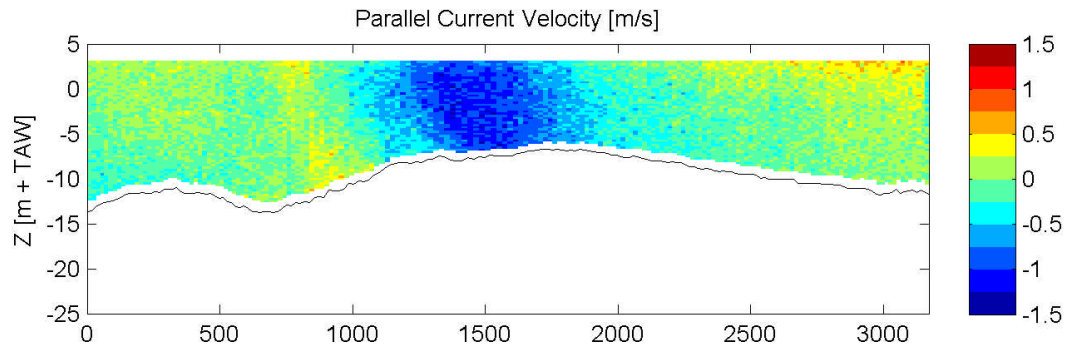
ADCP

Sourcefile:

0381024.csv

Location:

Zuidergat langsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:35 - 16:23

Time after HW [HH:MM]

0:29

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

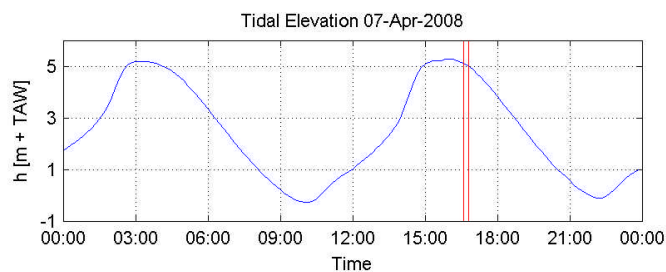
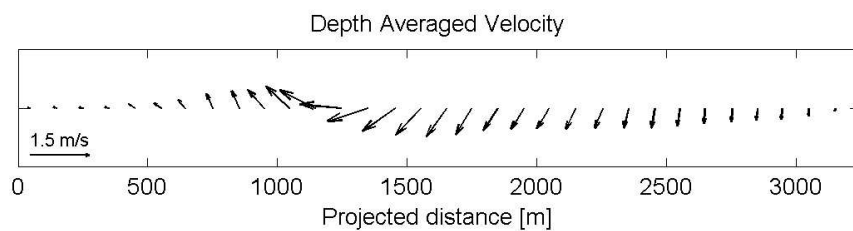
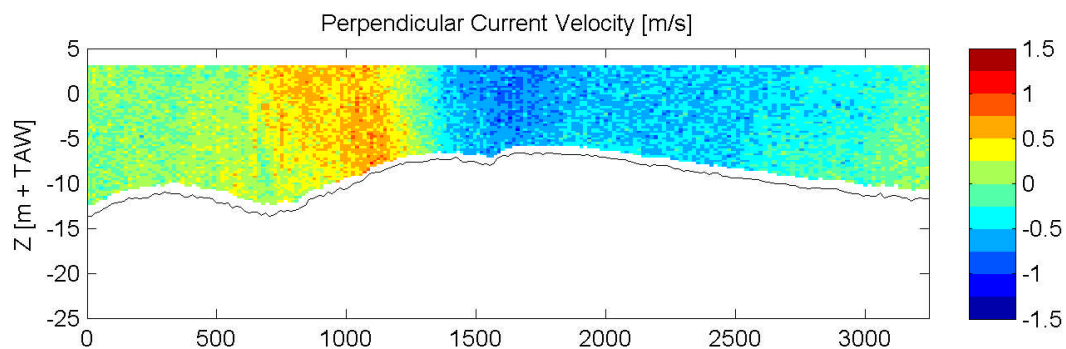
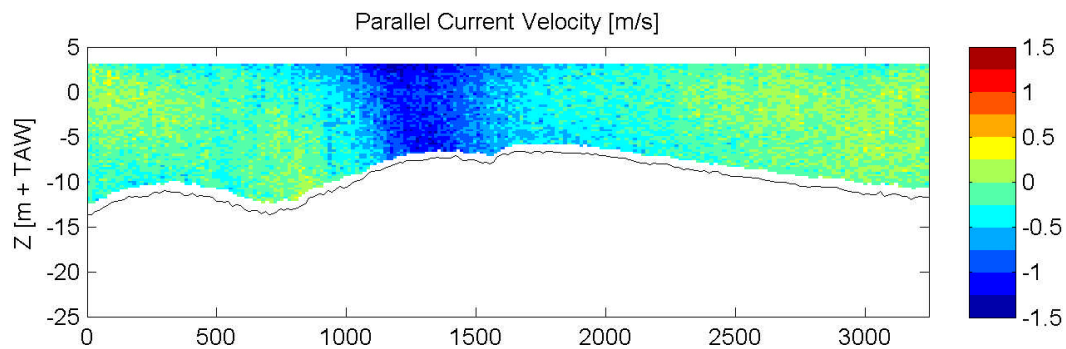
ADCP

Sourcefile:

0381025.csv

Location:

Zuidergat langsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:35 - 16:49

Time after HW [HH:MM]

0:42

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

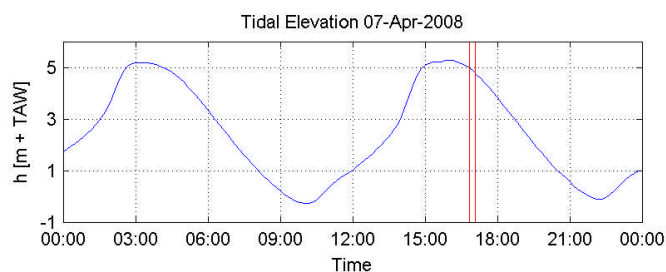
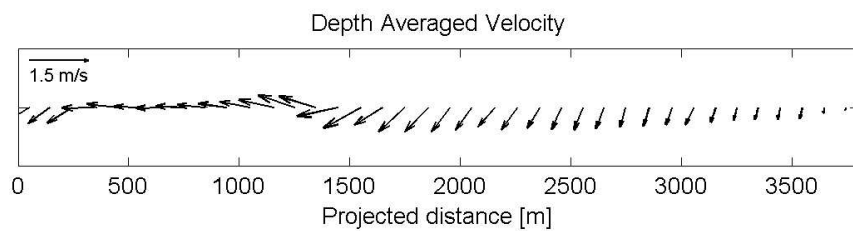
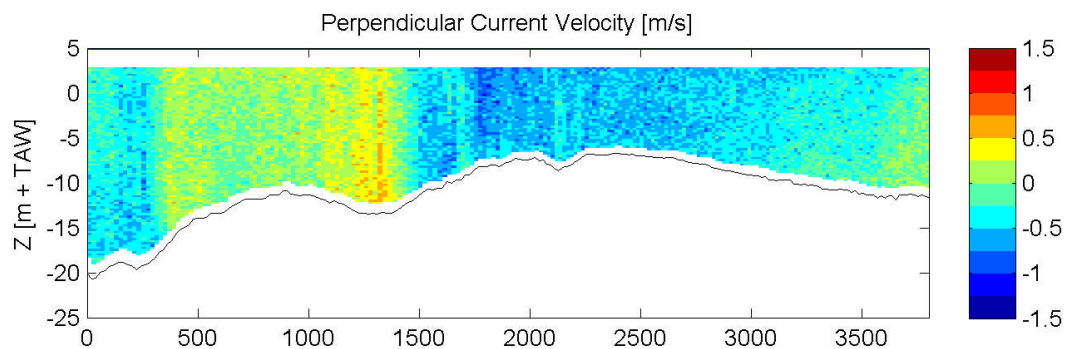
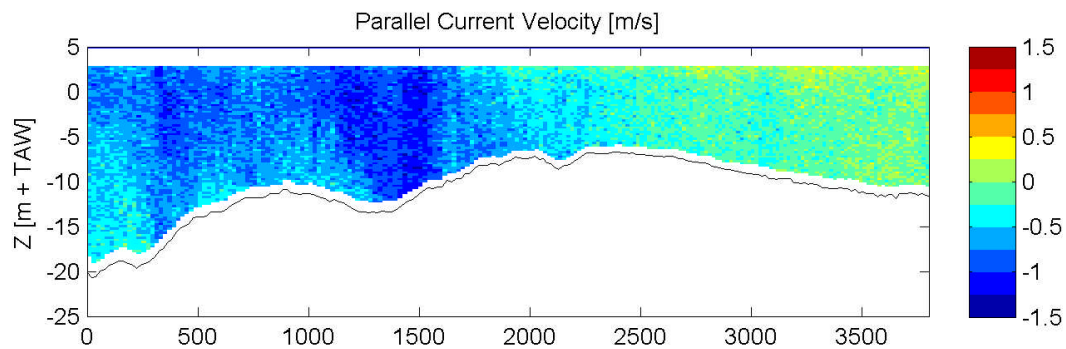
ADCP

Sourcefile:

0381026.csv

Location:

Zuidergat langsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

17:04 - 16:51

Time after HW [HH:MM]

0:58

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

### **D.3 Dwarsraai 07/04/08**

### **D.3.1. Raai 1**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

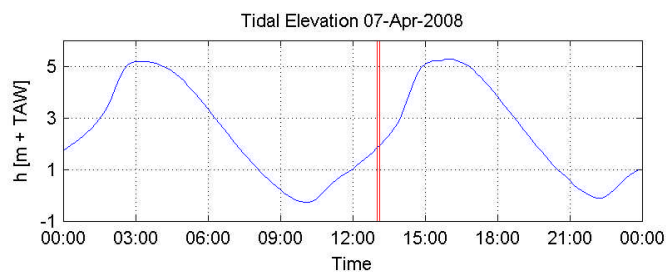
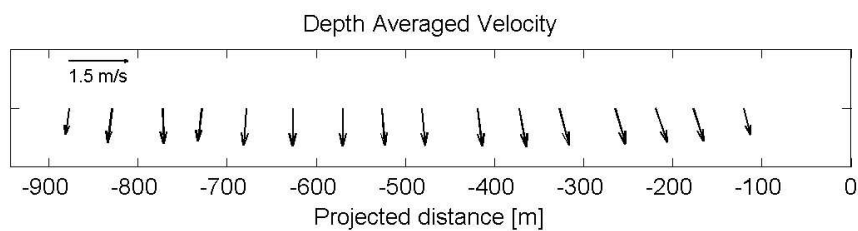
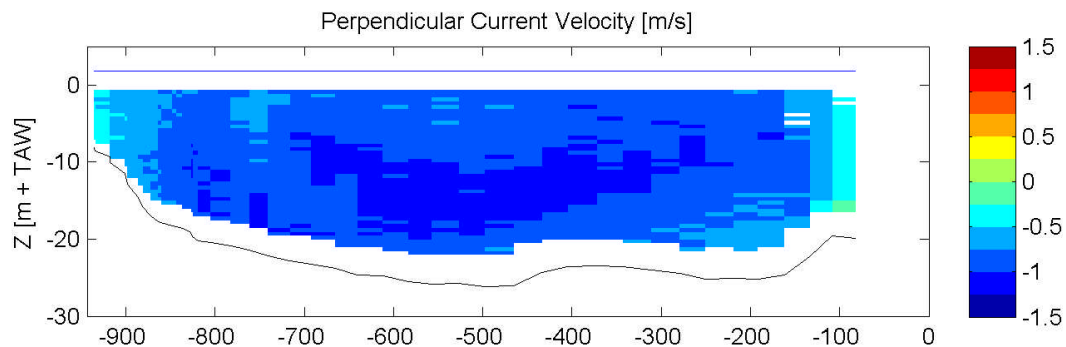
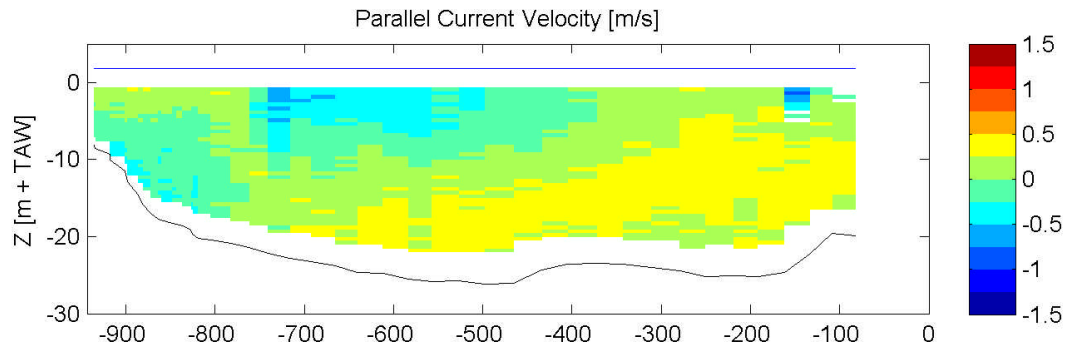
ADCP

Sourcefile:

OS080407\_01r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

13:01 - 13:08

Time after HW [HH:MM]

-2:55

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

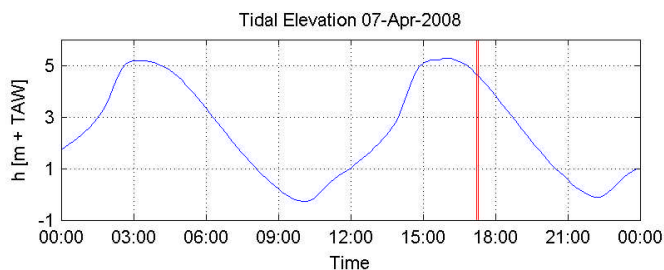
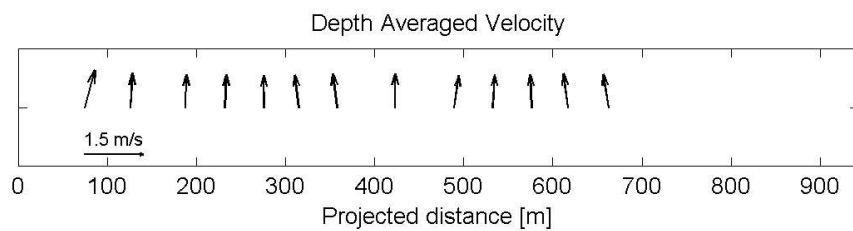
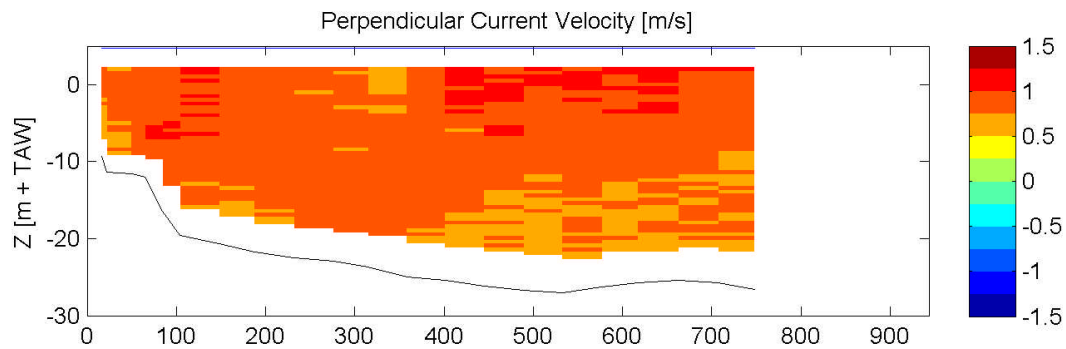
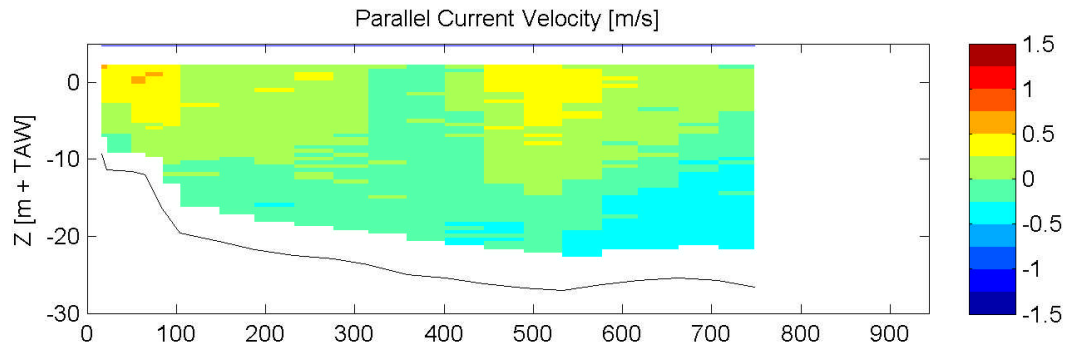
ADCP

Sourcefile:

OS080407\_30r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET]:

07-Apr-2008

17:14 - 17:17

Time after HW [HH:MM]

1:15

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

### **D.3.2. Raai 2**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

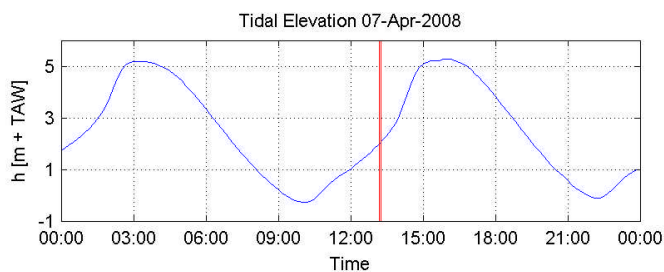
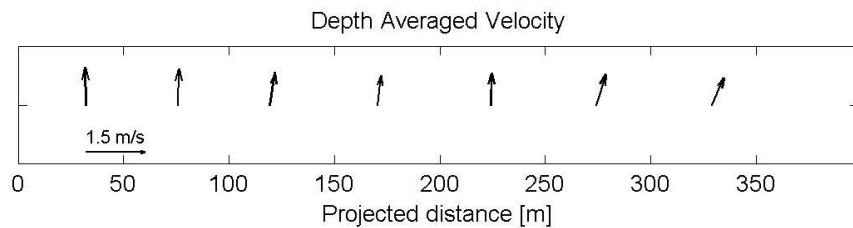
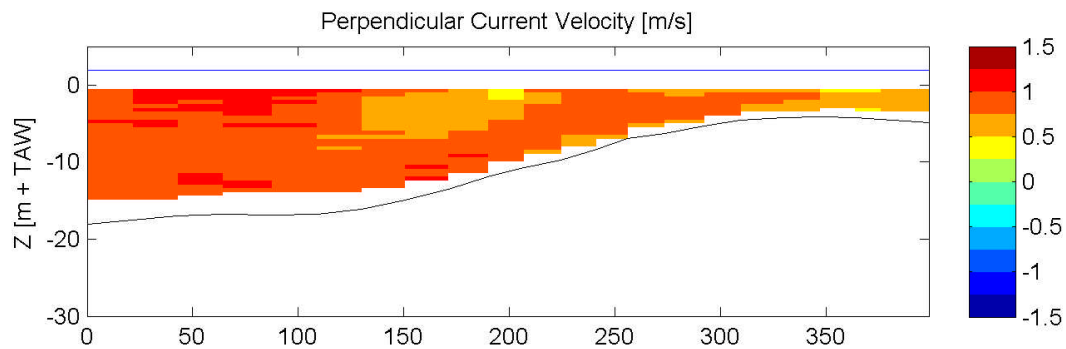
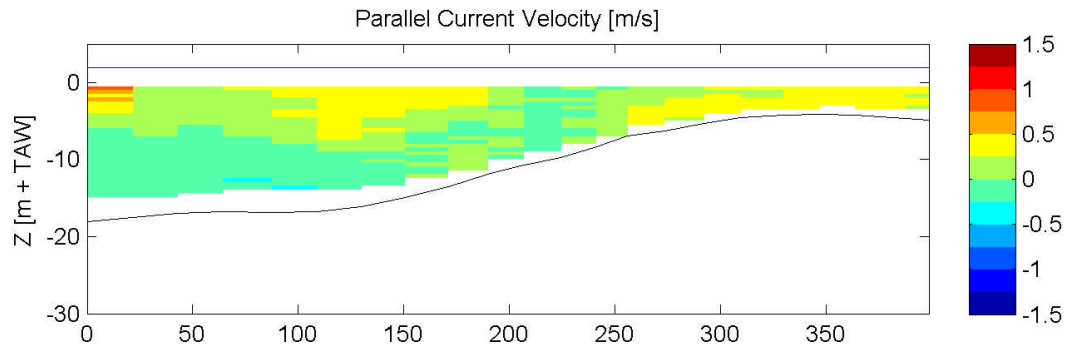
ADCP

Sourcefile:

OS080407\_02r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

13:11 - 13:15

Time after HW [HH:MM]

-2:46

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

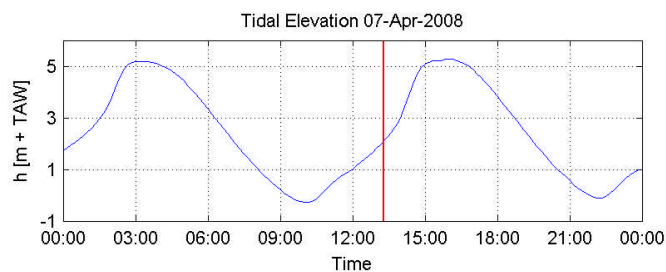
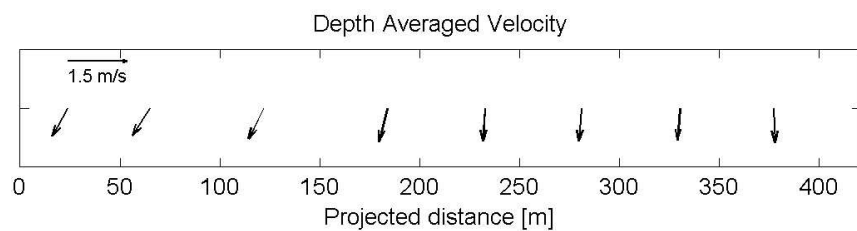
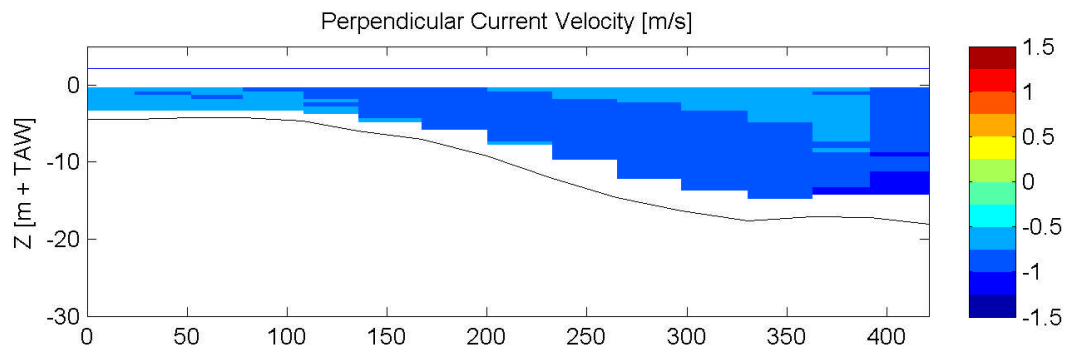
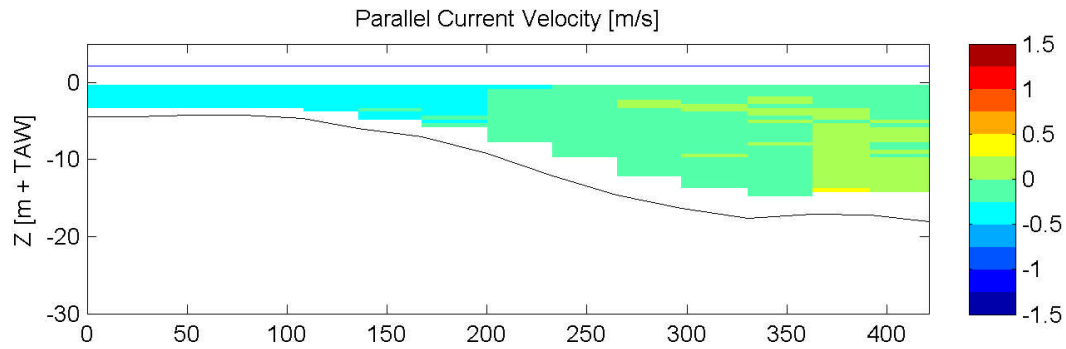
ADCP

Sourcefile:

OS080407\_03r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

13:16 - 13:18

Time after HW [HH:MM]

-2:42

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

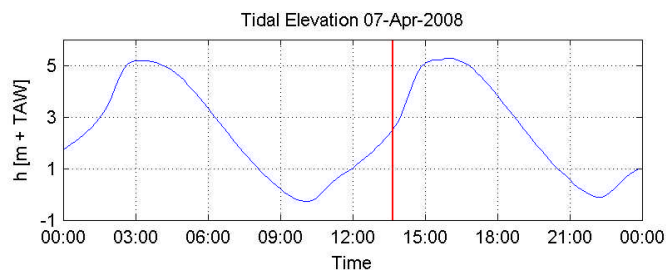
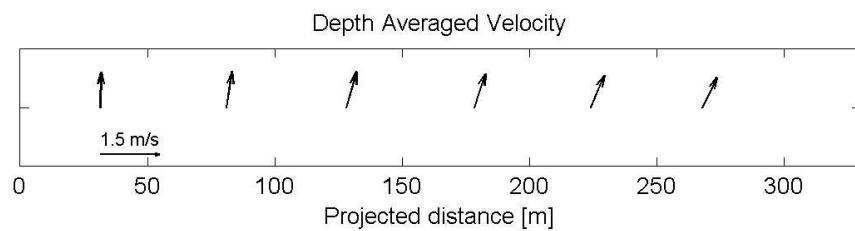
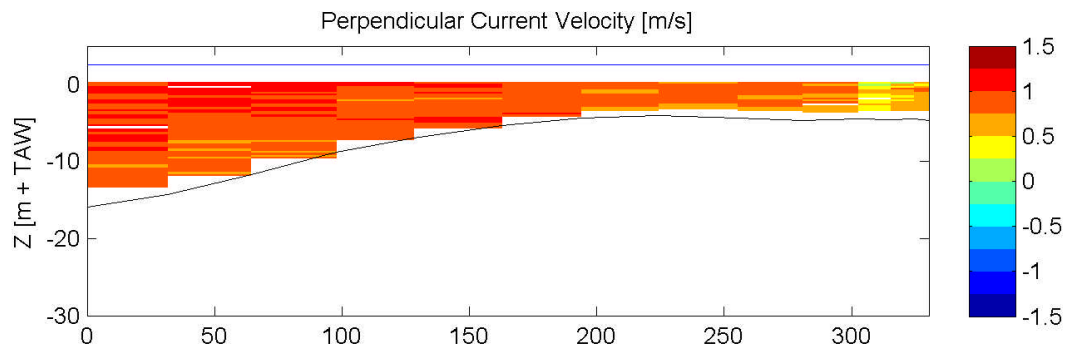
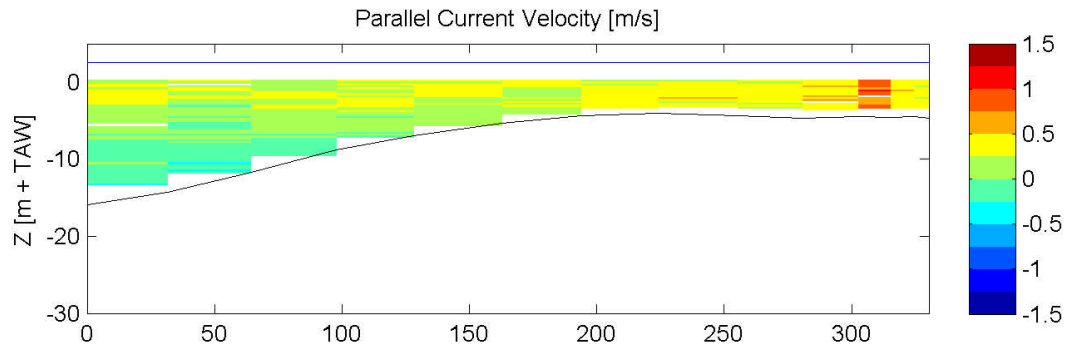
ADCP

Sourcefile:

OS080407\_04r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

13:38 - 13:39

Time after HW [HH:MM]

-2:21

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

### **D.3.3. Raai 3**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

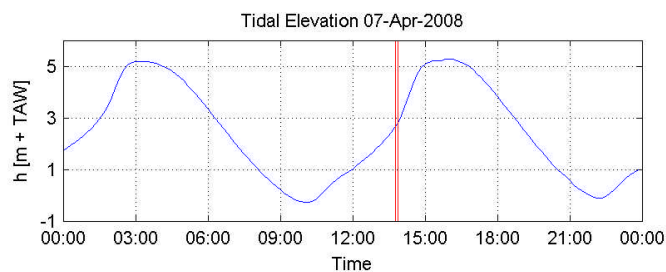
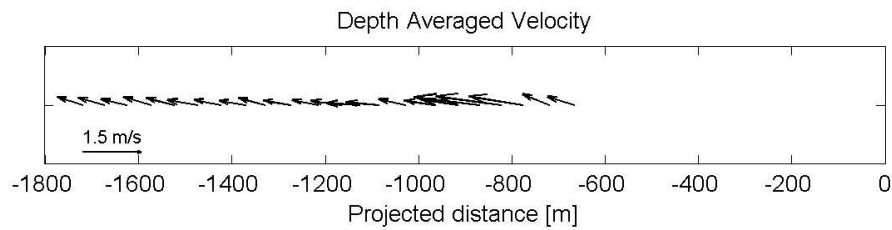
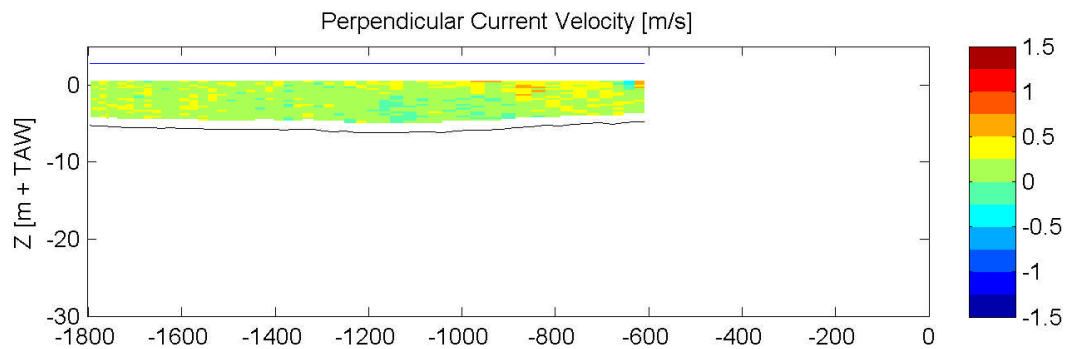
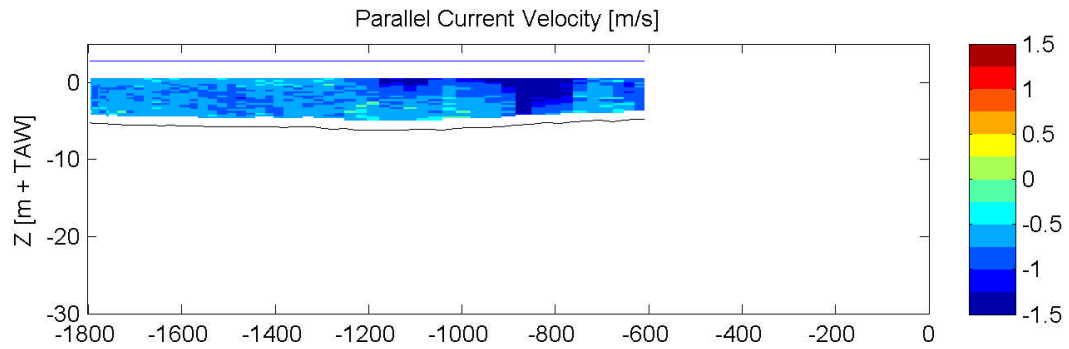
ADCP

Sourcefile:

OS080407\_05r\_sub.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

13:45 - 13:53

Time after HW [HH:MM]

-2:10

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

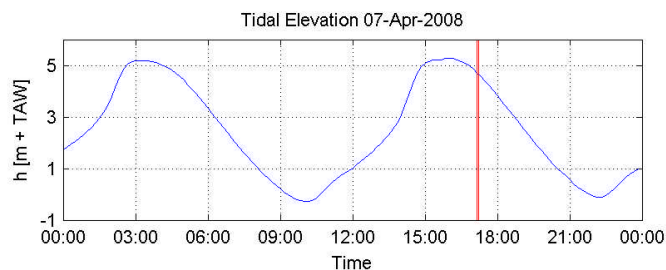
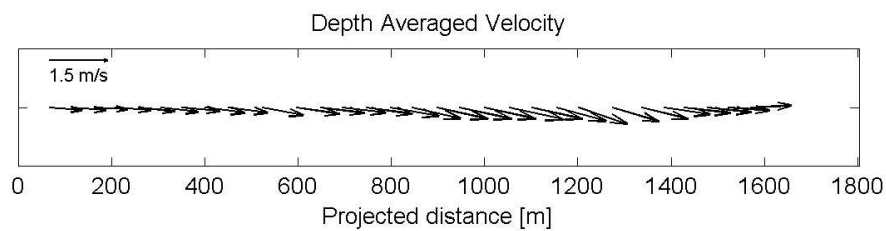
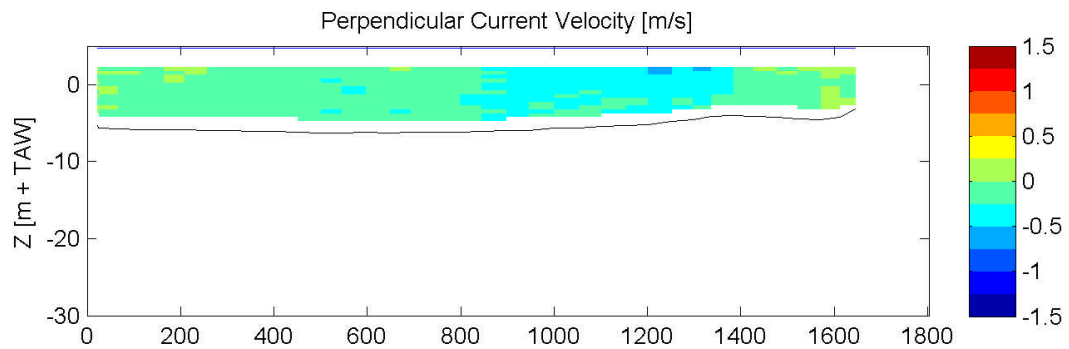
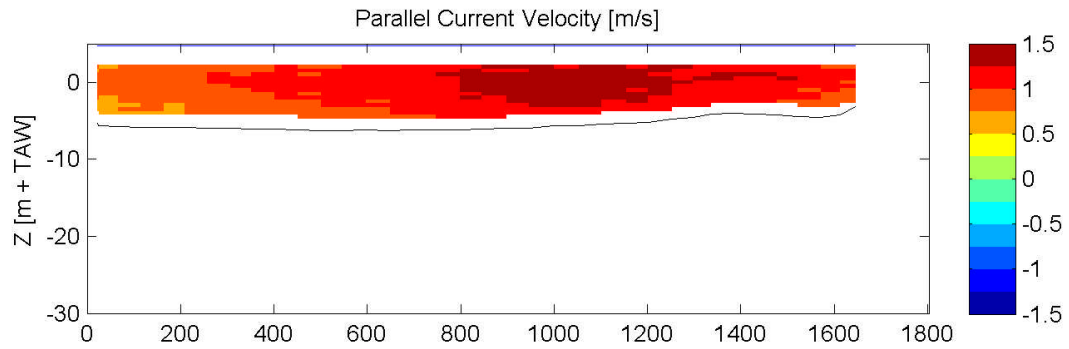
ADCP

Sourcefile:

OS080407\_29r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET]:

07-Apr-2008

17:08 - 17:13

Time after HW [HH:MM]

1:11

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

#### **D.3.4. Raai 4**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

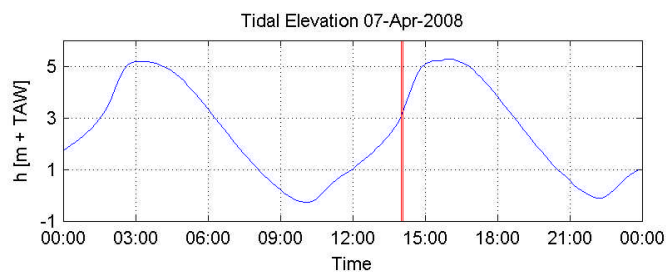
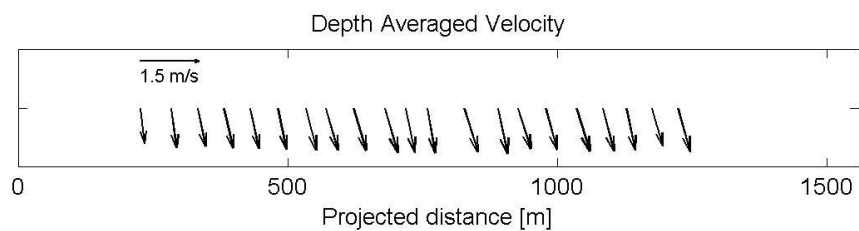
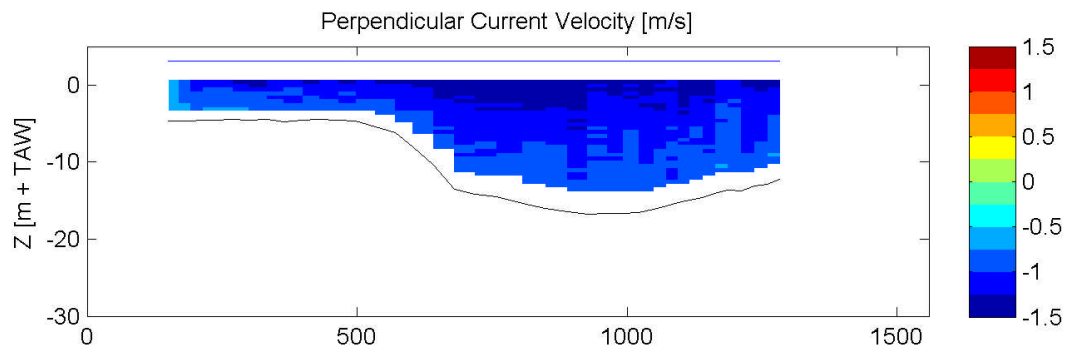
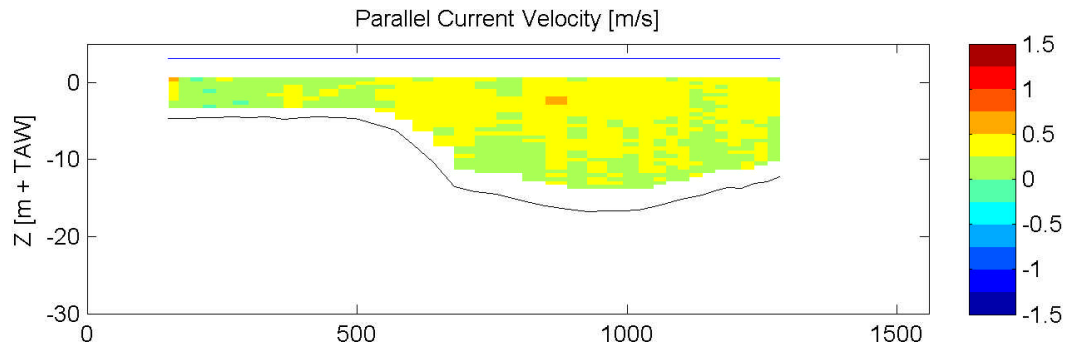
ADCP

Sourcefile:

OS080407\_06r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

14:00 - 14:05

Time after HW [HH:MM]

-1:56

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

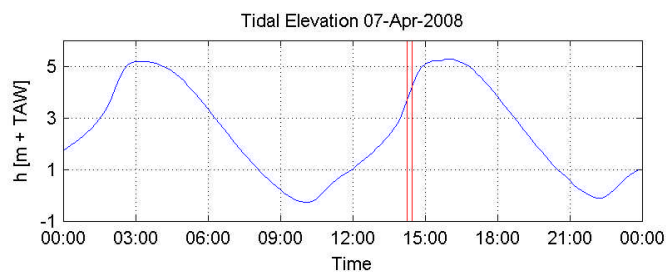
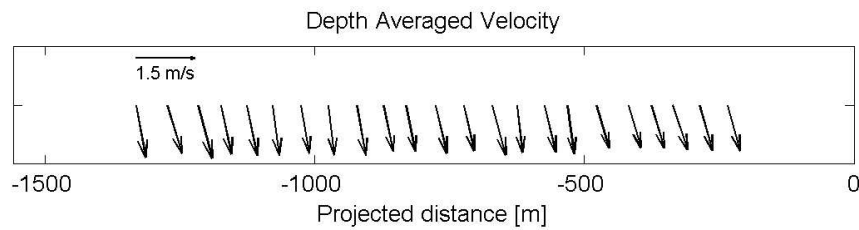
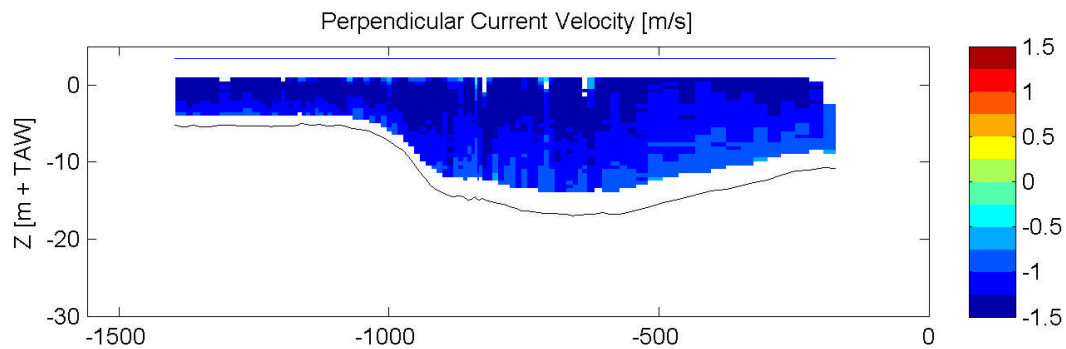
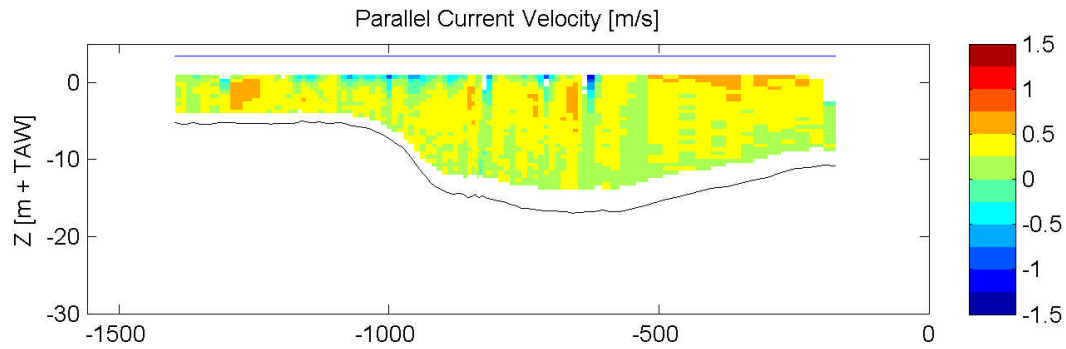
ADCP

Sourcefile:

OS080407\_07r\_sub.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

14:14 - 14:28

Time after HW [HH:MM]

-1:38

Data Processed by:



In association with:

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

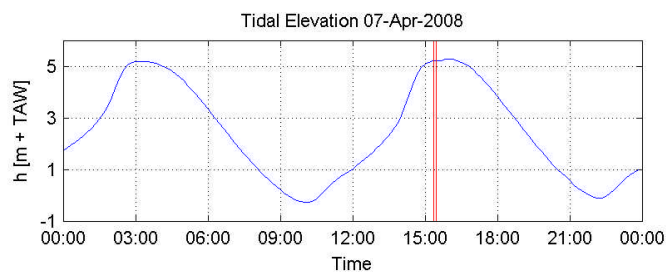
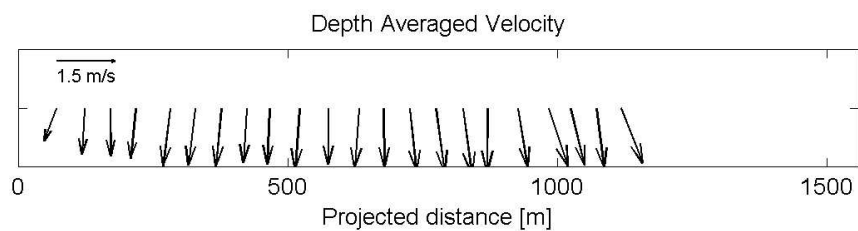
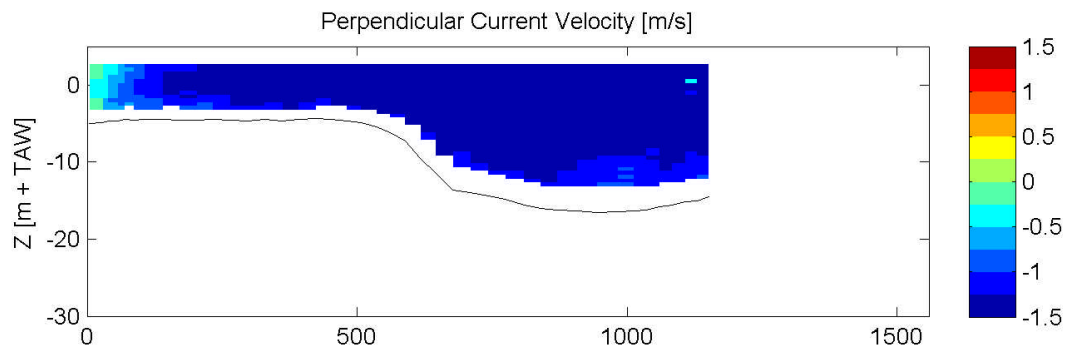
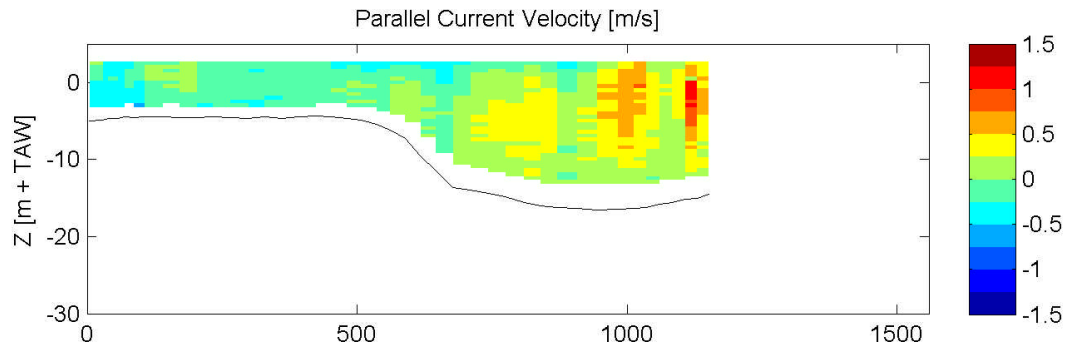
ADCP

Sourcefile:

OS080407\_12r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:21 - 15:27

Time after HW [HH:MM]

-0:35

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

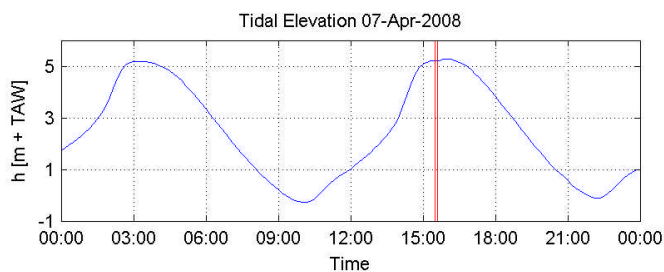
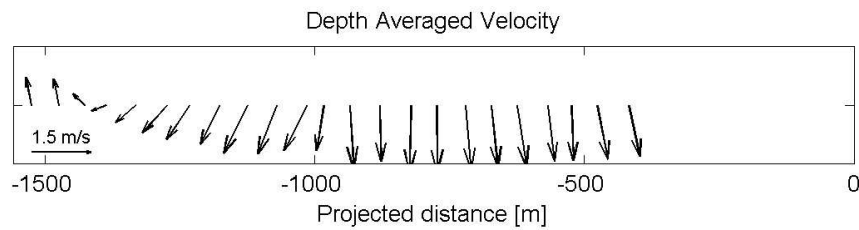
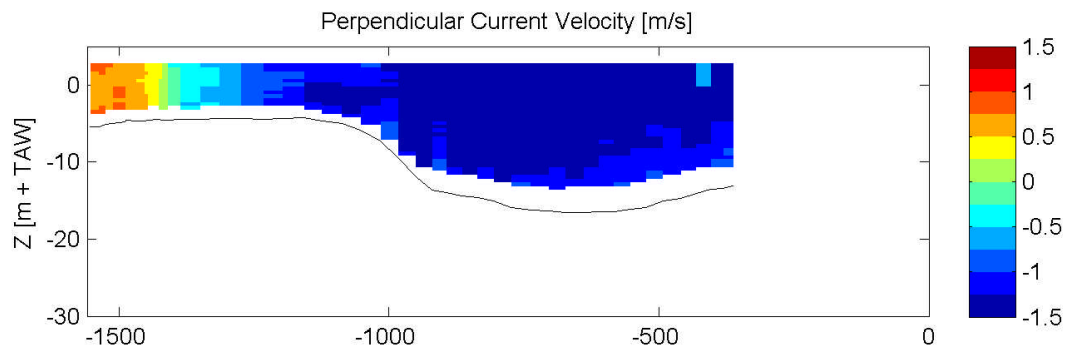
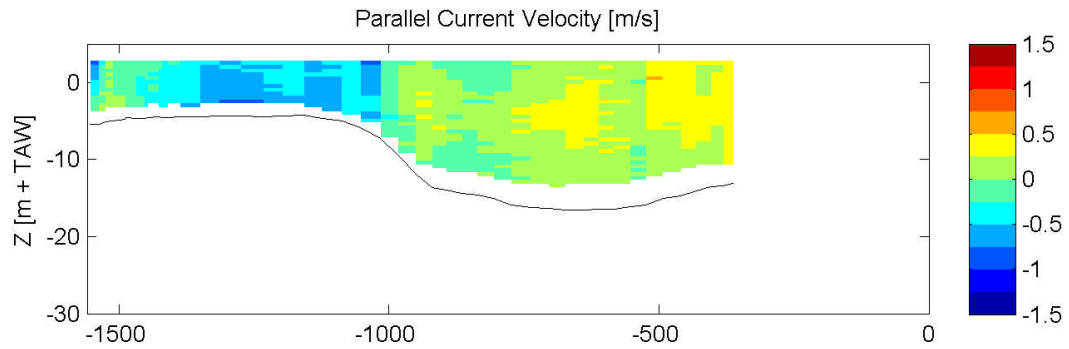
ADCP

Sourcefile:

OS080407\_14r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:29 - 15:35

Time after HW [HH:MM]

-0:27

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

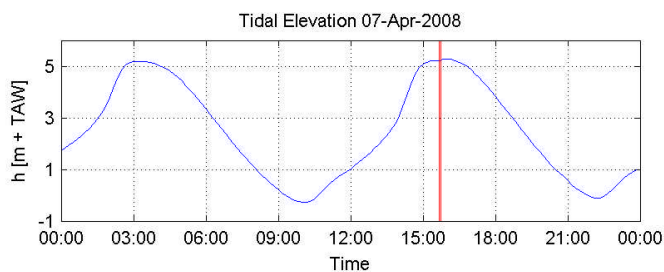
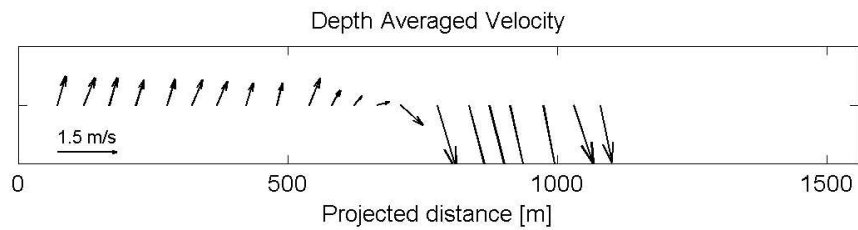
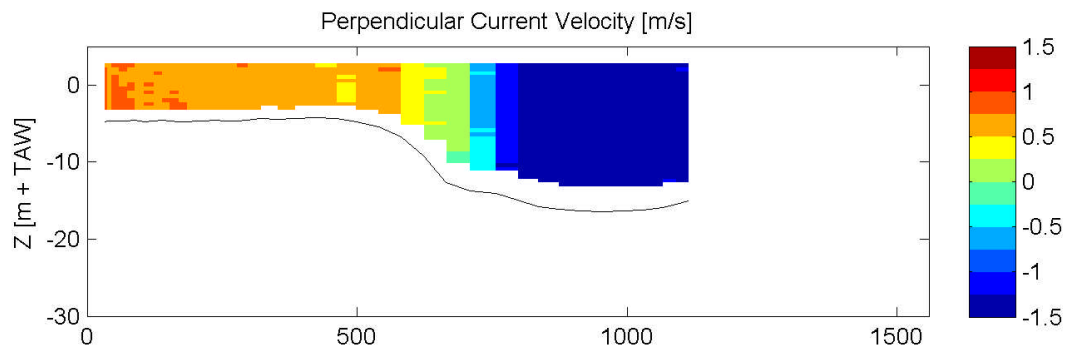
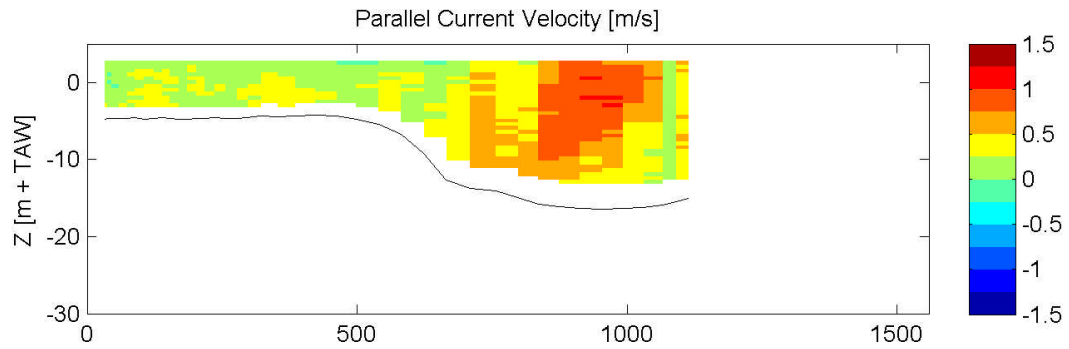
ADCP

Sourcefile:

OS080407\_15r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:39 - 15:45

Time after HW [HH:MM]

-0:17

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

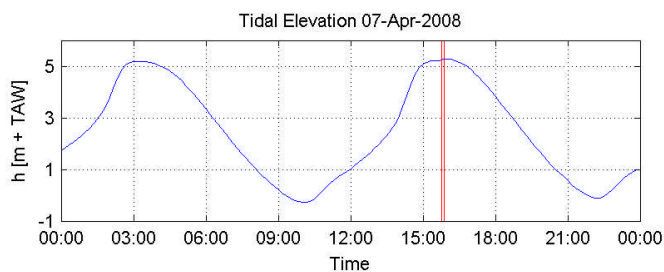
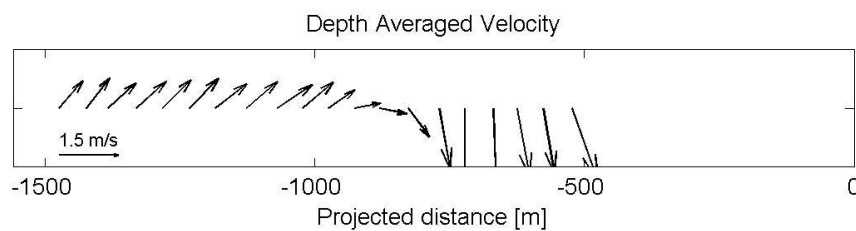
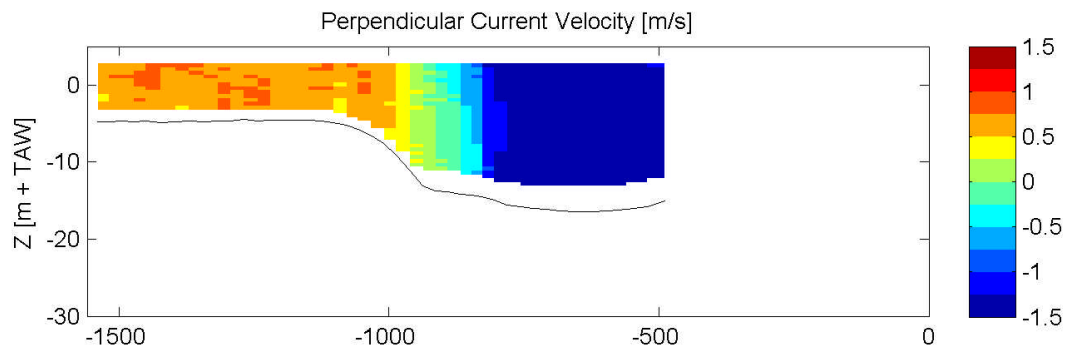
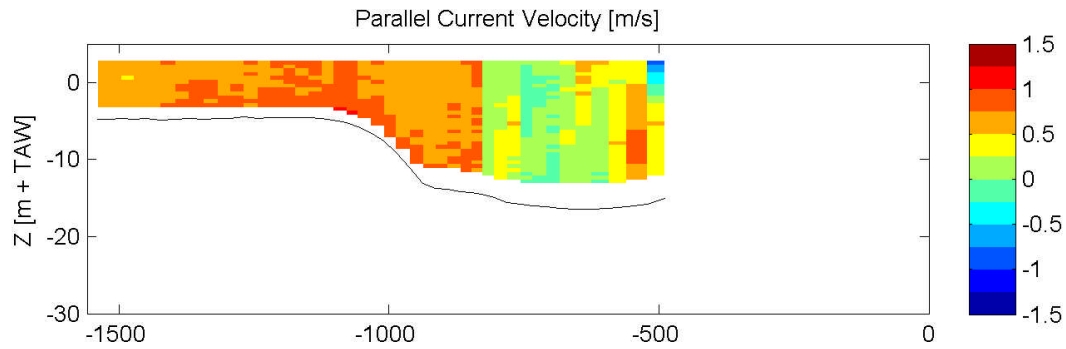
ADCP

Sourcefile:

OS080407\_16r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:46 - 15:52

Time after HW [HH:MM]

-0:10

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

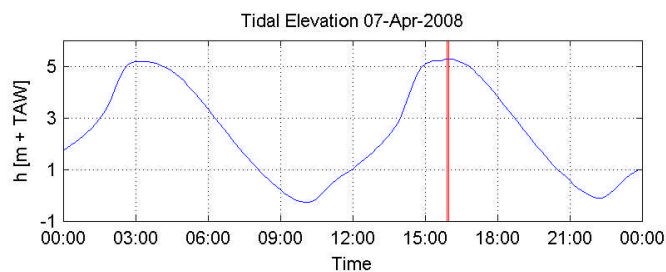
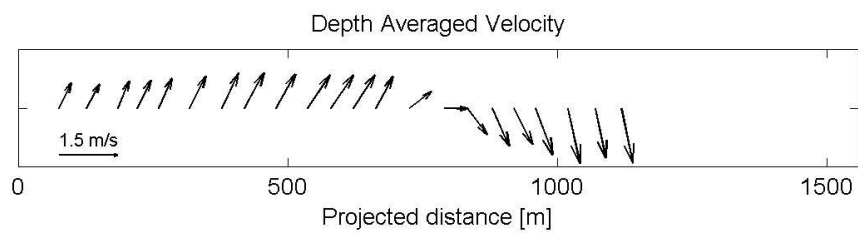
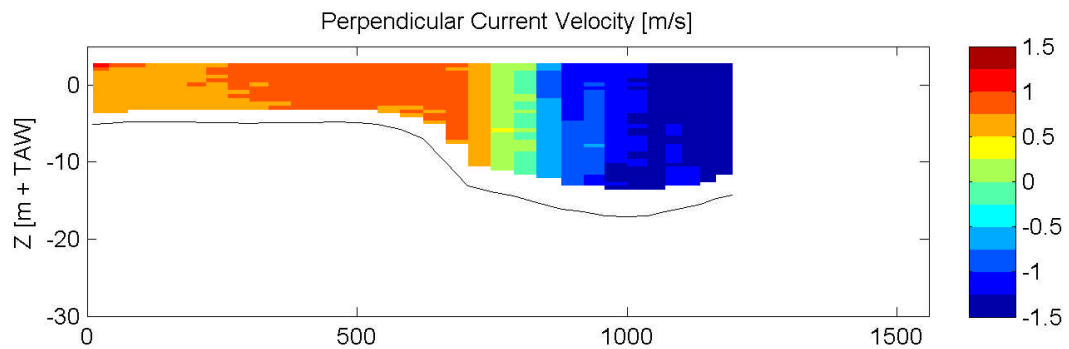
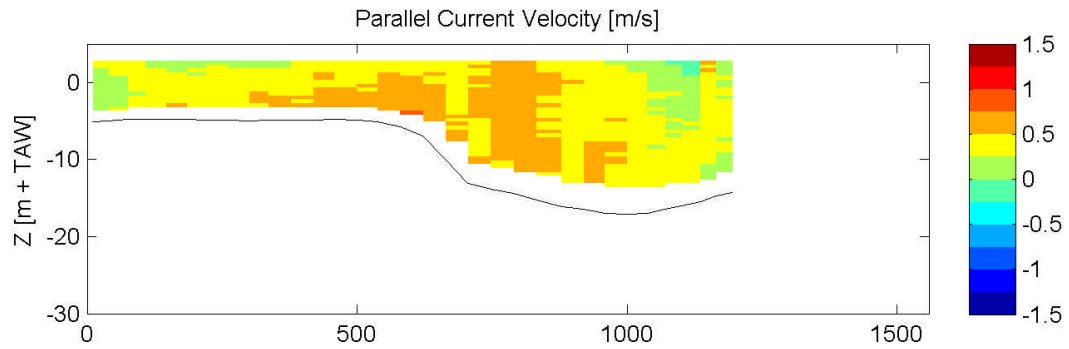
ADCP

Sourcefile:

OS080407\_17r\_sub.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:54 - 15:59

Time after HW [HH:MM]

-0:03

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

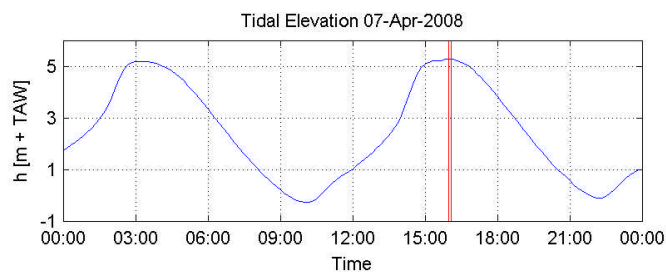
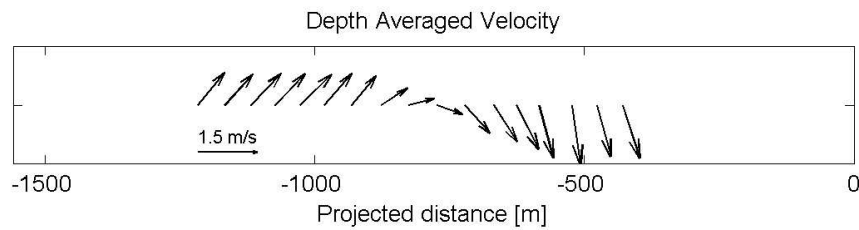
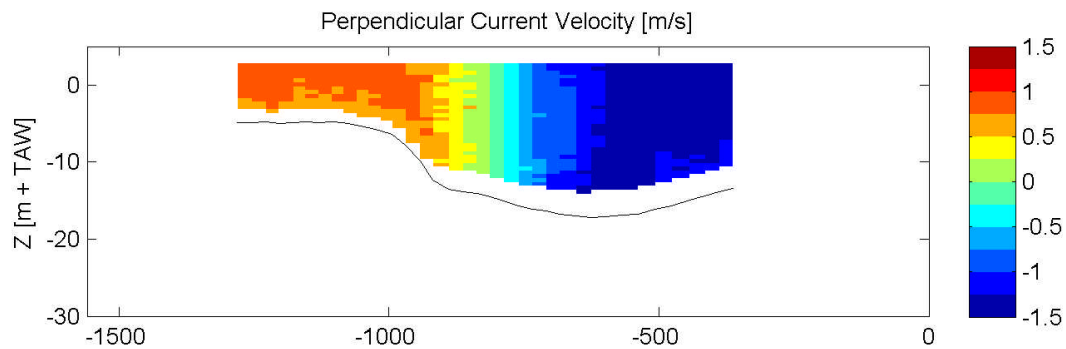
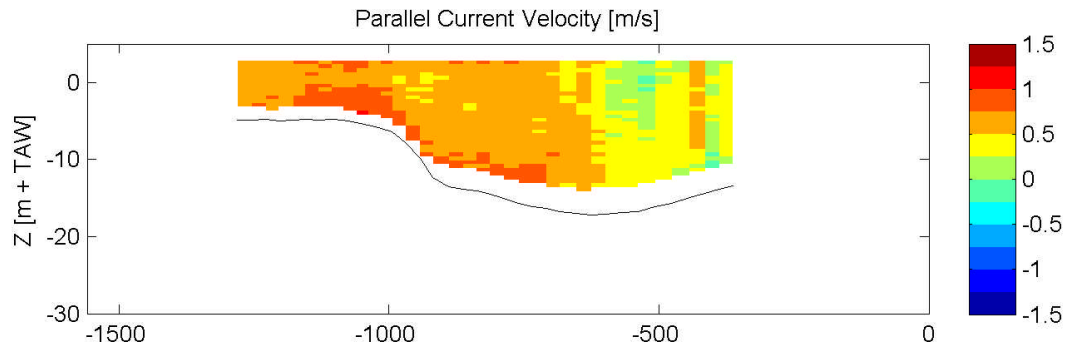
ADCP

Sourcefile:

OS080407\_18r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

15:59 - 16:05

Time after HW [HH:MM]

0:02

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

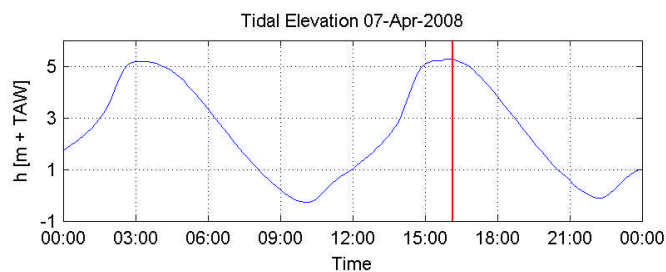
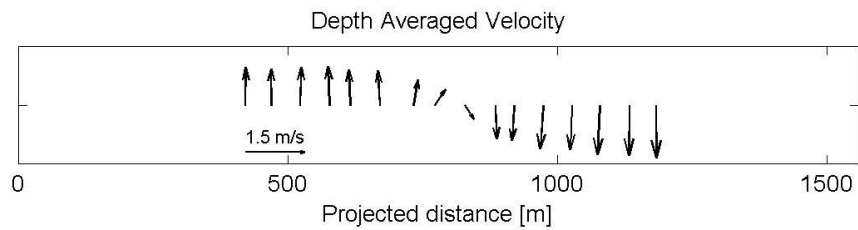
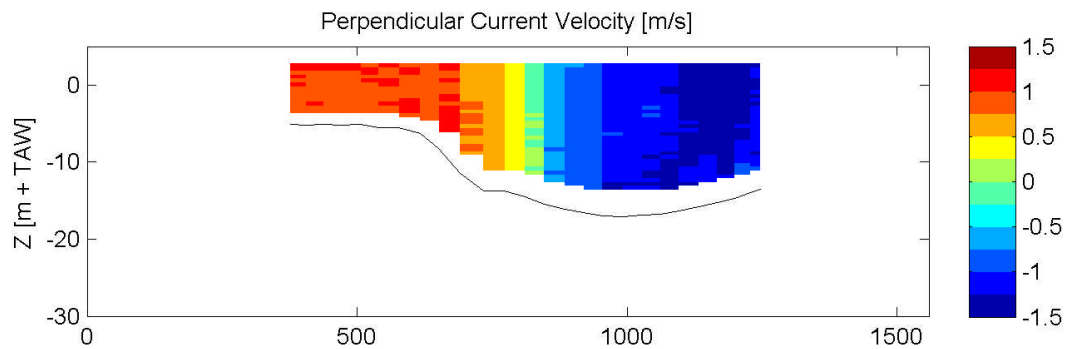
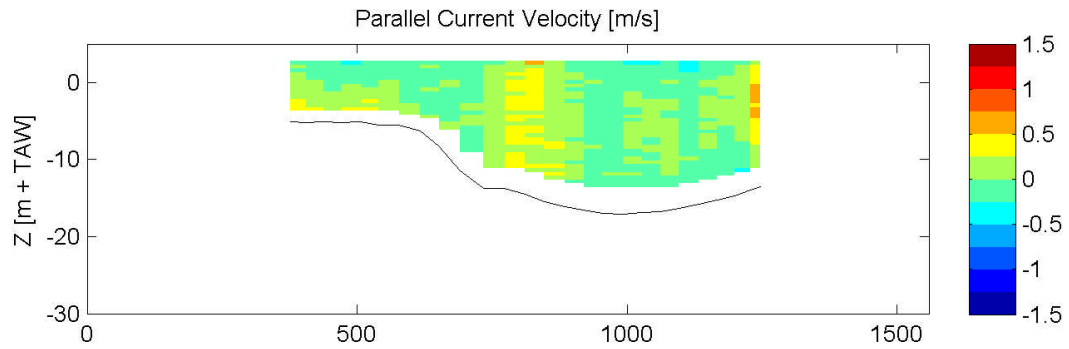
ADCP

Sourcefile:

OS080407\_19r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:06 - 16:10

Time after HW [HH:MM]

0:08

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

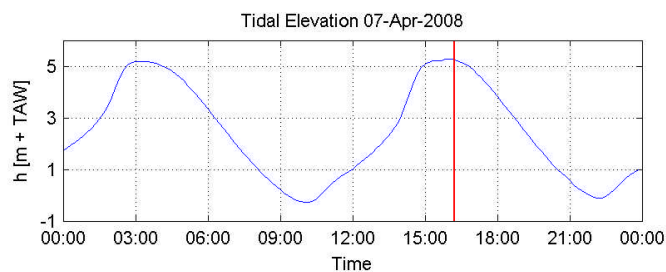
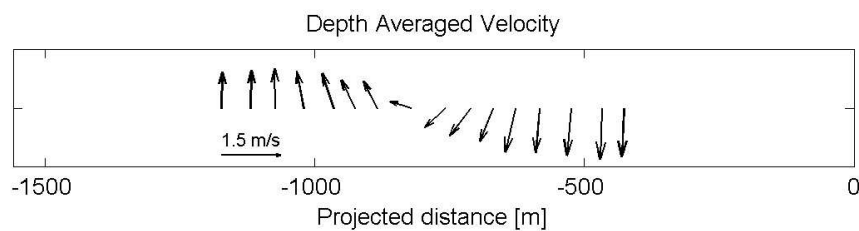
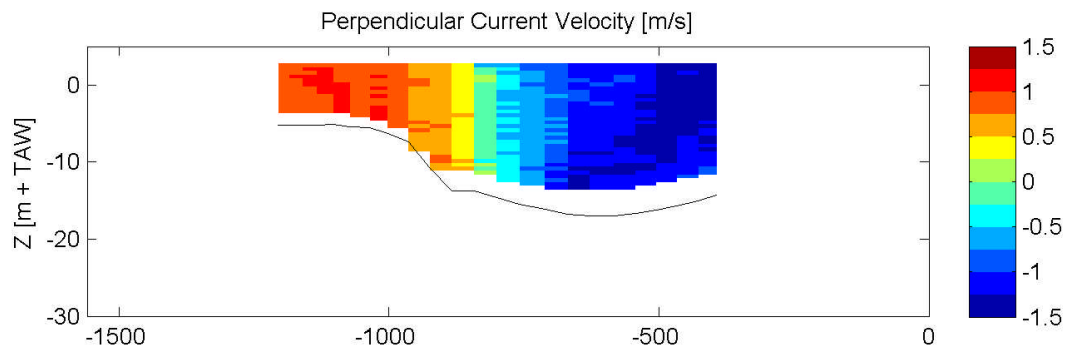
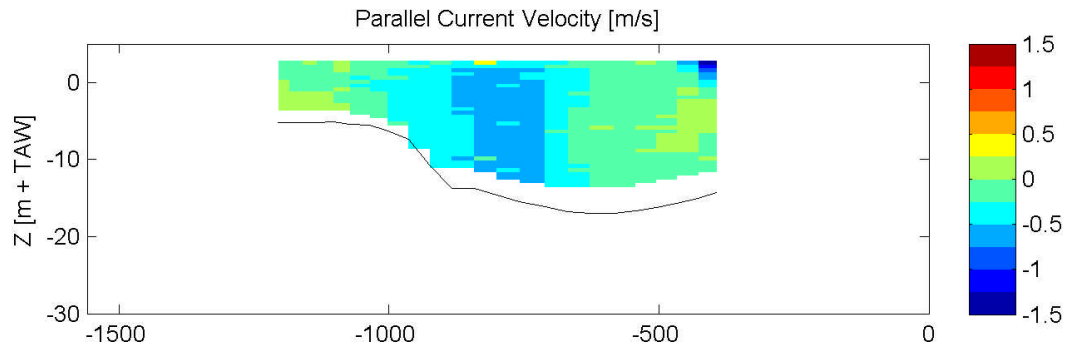
ADCP

Sourcefile:

OS080407\_20r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:10 - 16:13

Time after HW [HH:MM]

0:12

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

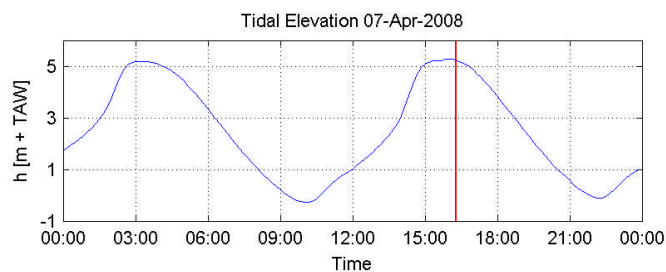
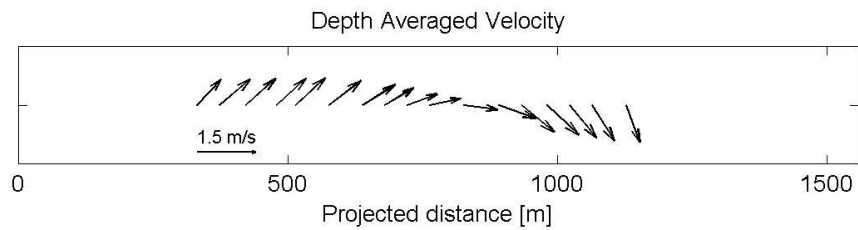
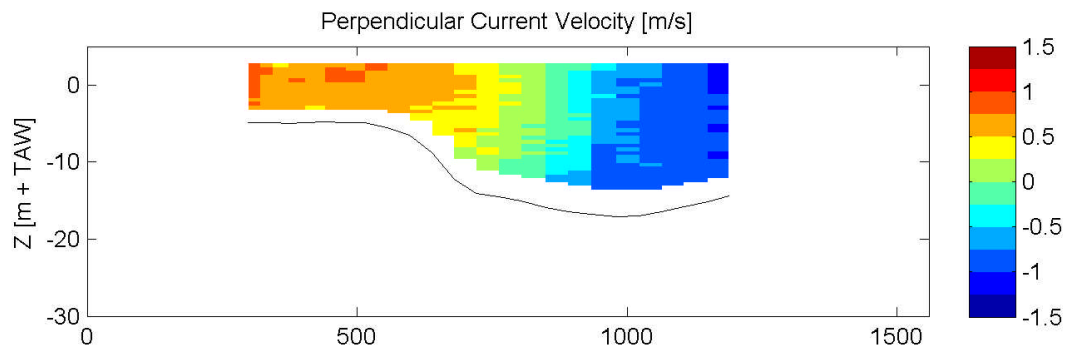
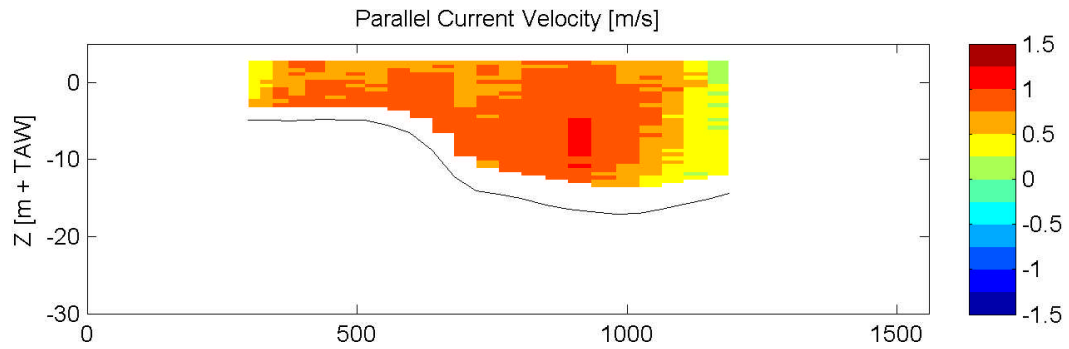
ADCP

Sourcefile:

OS080407\_21r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:14 - 16:18

Time after HW [HH:MM]

0:16

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

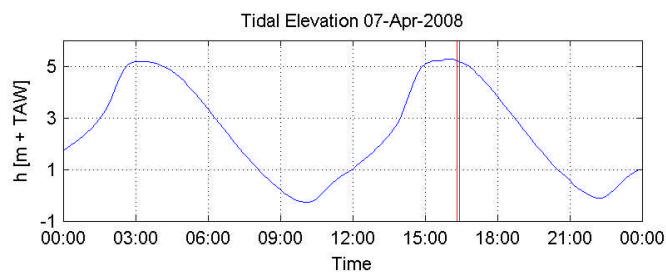
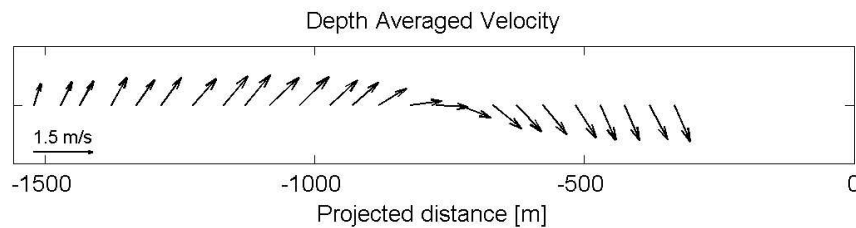
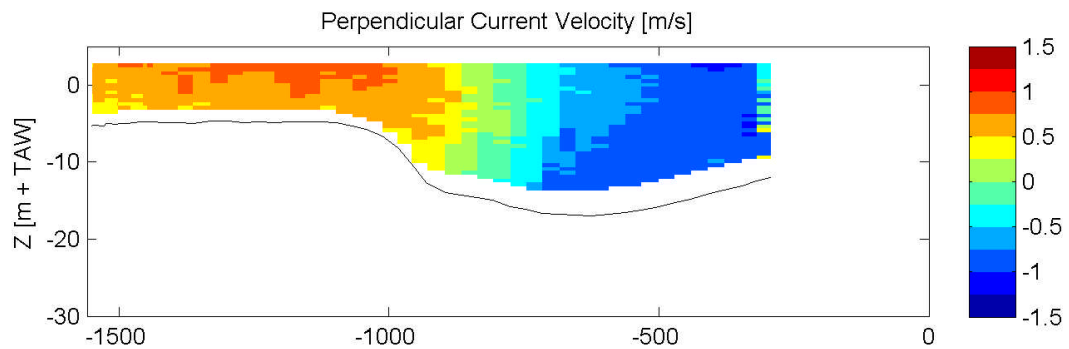
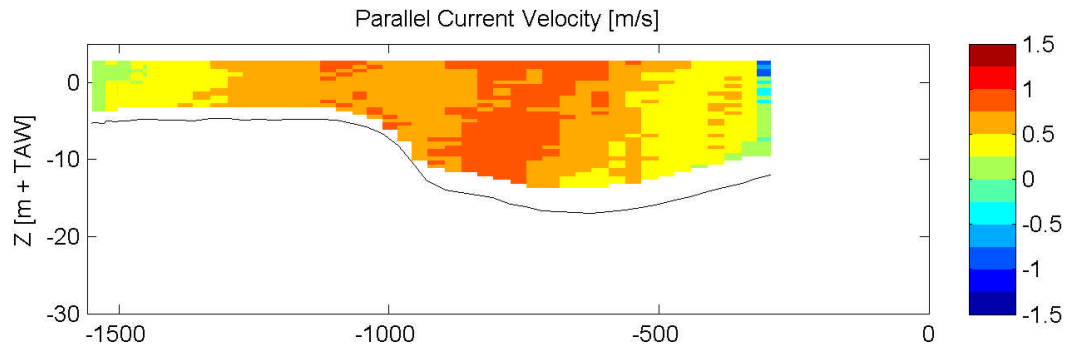
ADCP

Sourcefile:

OS080407\_22r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:19 - 16:26

Time after HW [HH:MM]

0:23

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

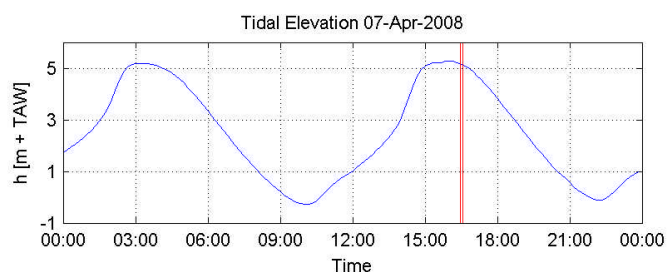
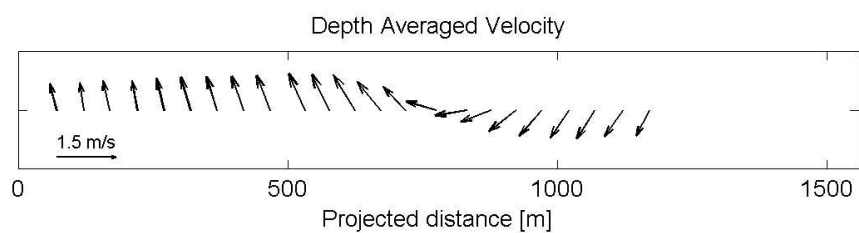
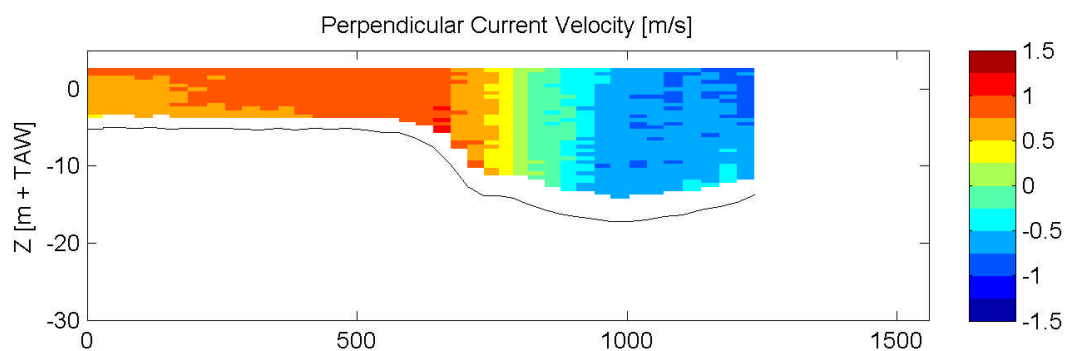
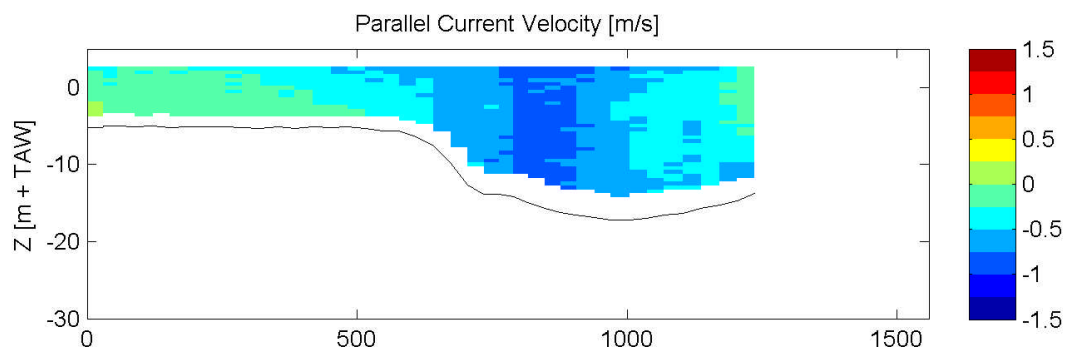
ADCP

Sourcefile:

OS080407\_23r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:28 - 16:34

Time after HW [HH:MM]

0:31

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

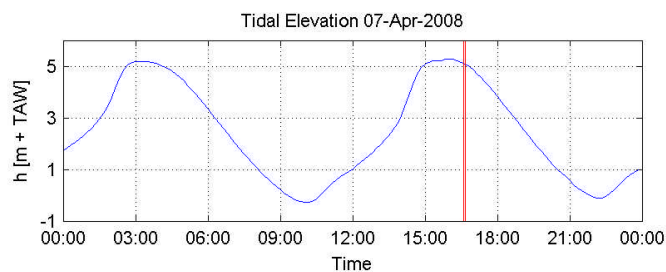
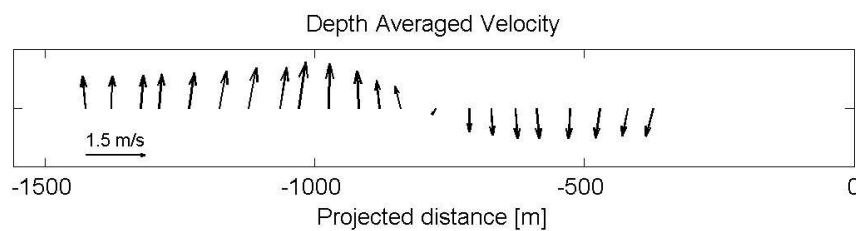
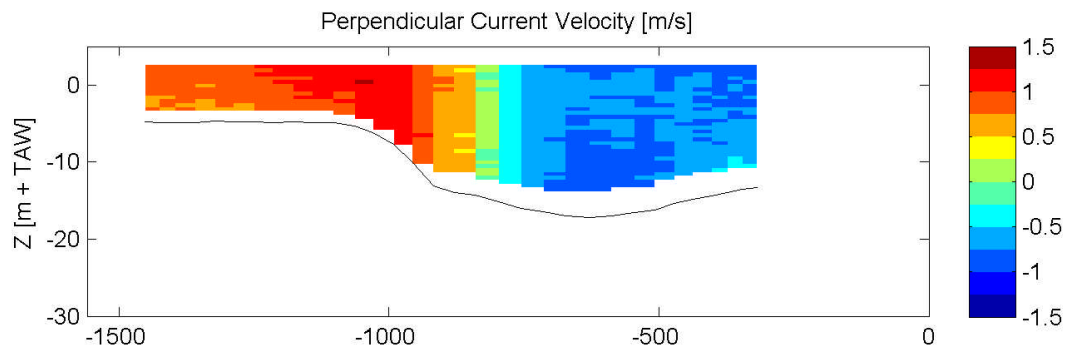
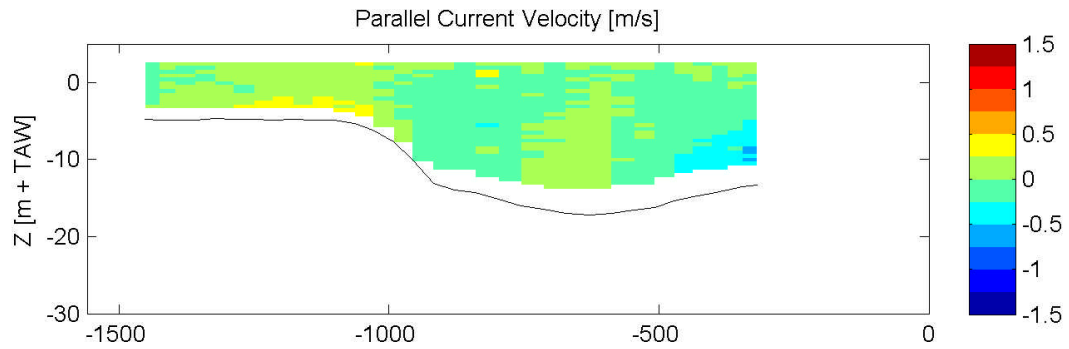
ADCP

Sourcefile:

OS080407\_24r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:35 - 16:40

Time after HW [HH:MM]

0:37

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

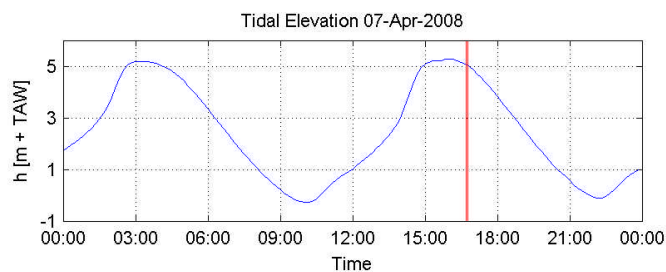
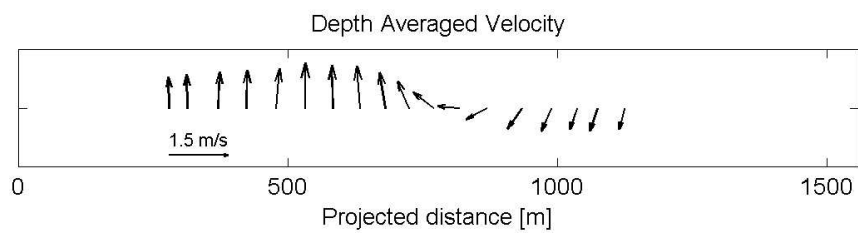
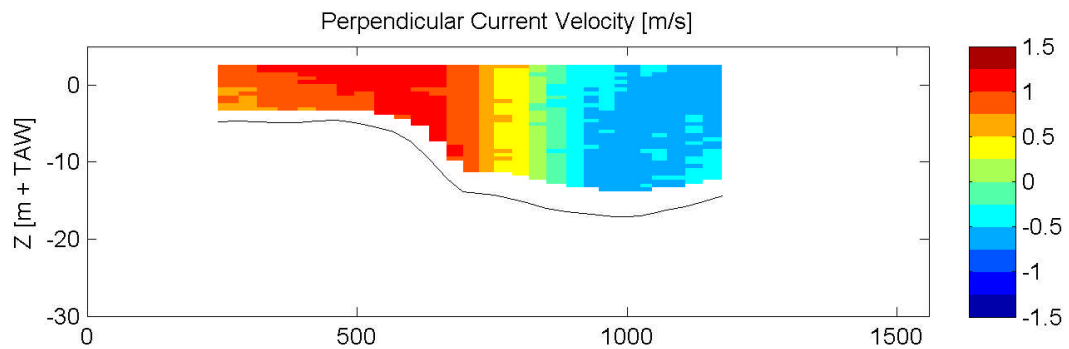
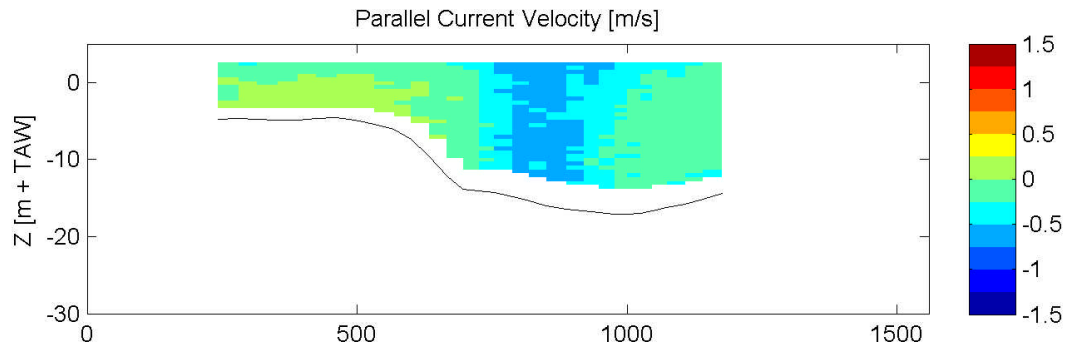
ADCP

Sourcefile:

OS080407\_25r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:41 - 16:45

Time after HW [HH:MM]

0:43

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

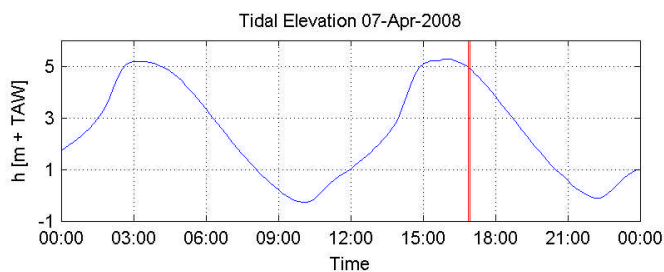
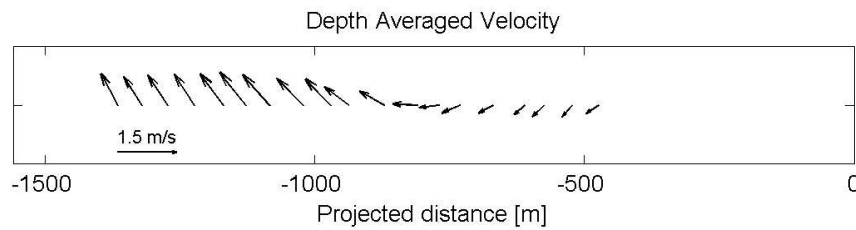
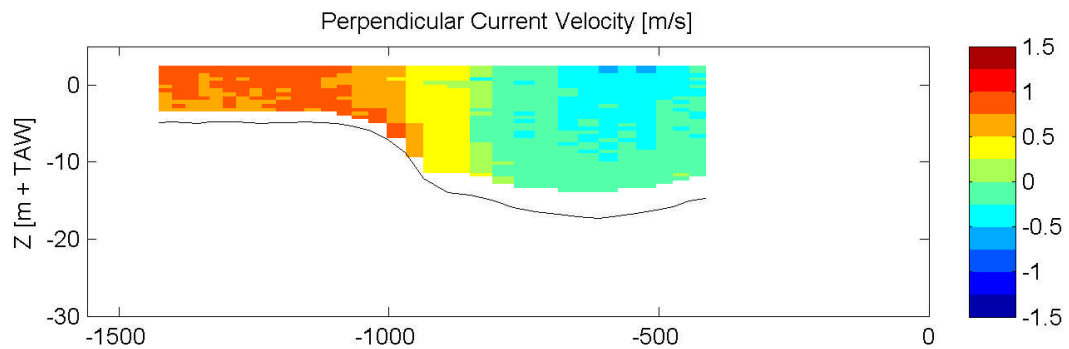
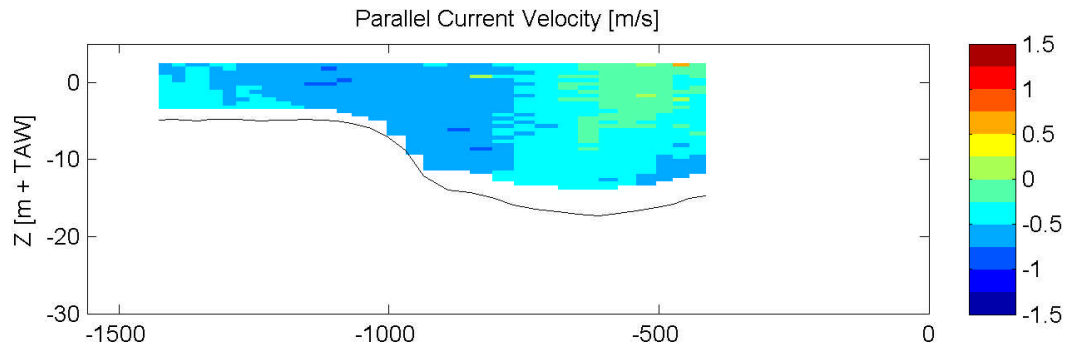
ADCP

Sourcefile:

OS080407\_26r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:52 - 16:57

Time after HW [HH:MM]

0:54

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

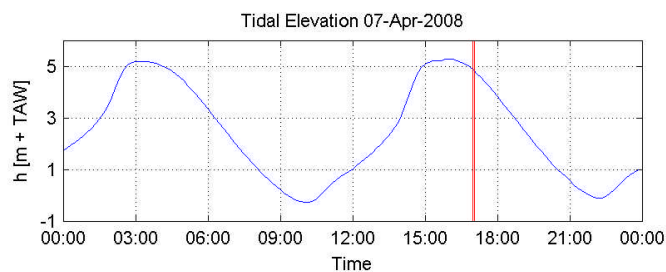
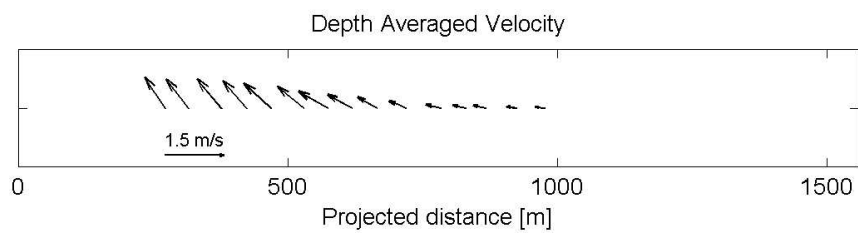
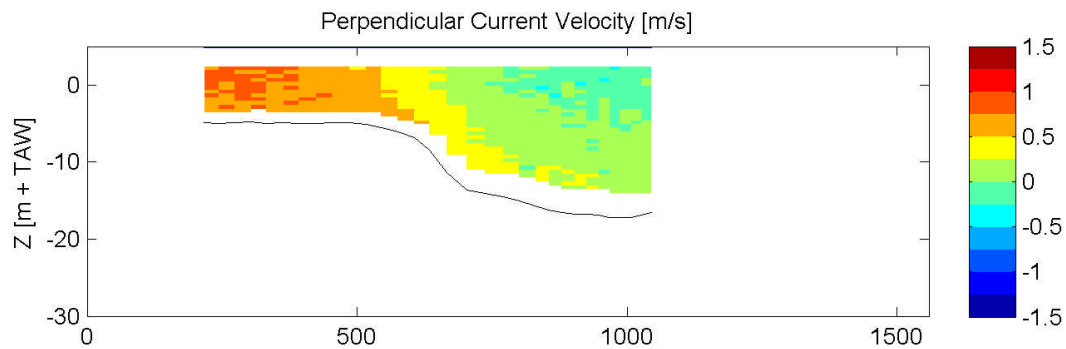
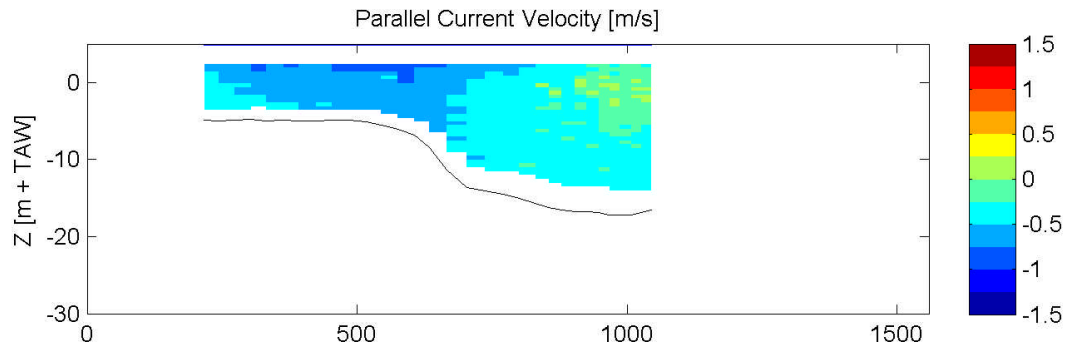
ADCP

Sourcefile:

OS080407\_27r.csv

Location:

Zuidergat dwarsraai



HW/LW:

03:10: h = 5.19 m+TAW

10:00: h = -0.29 m+TAW

16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

16:58 - 17:02

Time after HW [HH:MM]

1:00

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

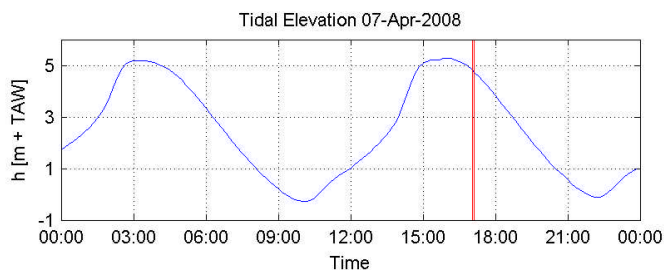
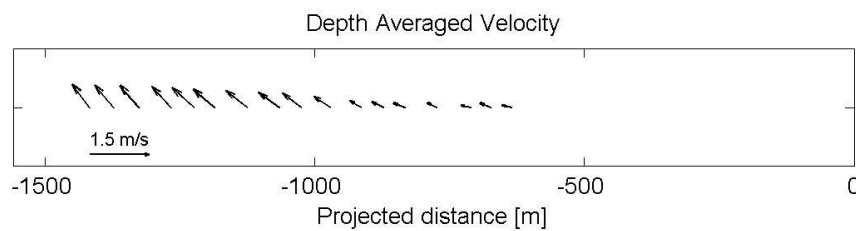
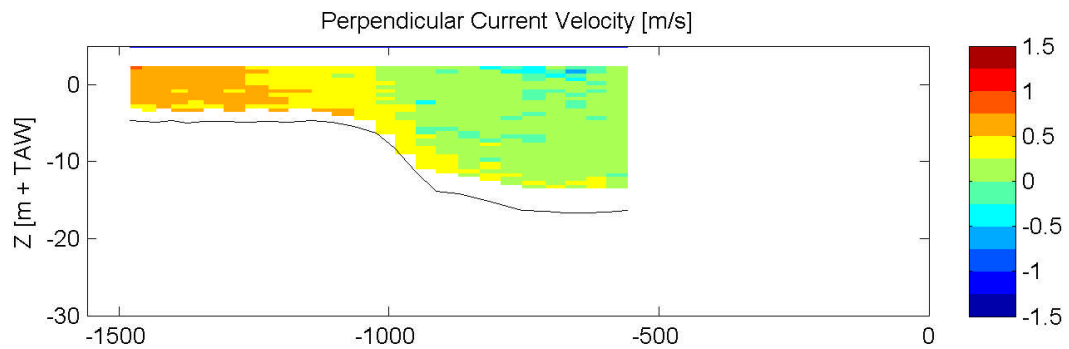
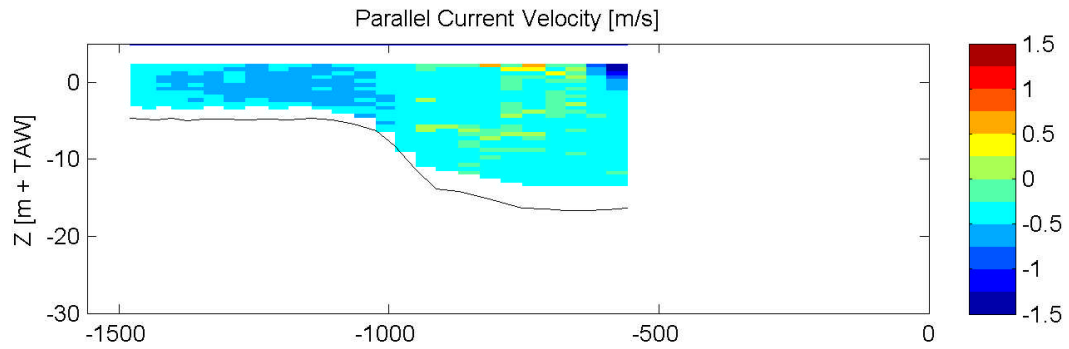
ADCP

Sourcefile:

OS080407\_28r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

17:03 - 17:07

Time after HW [HH:MM]

1:05

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

### **D.3.5. Raai 5**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

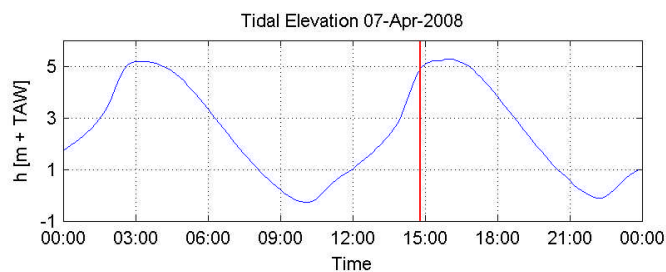
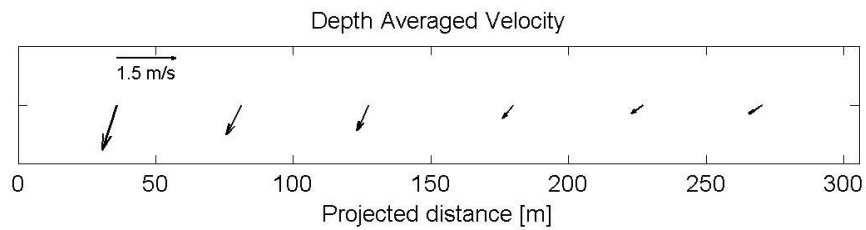
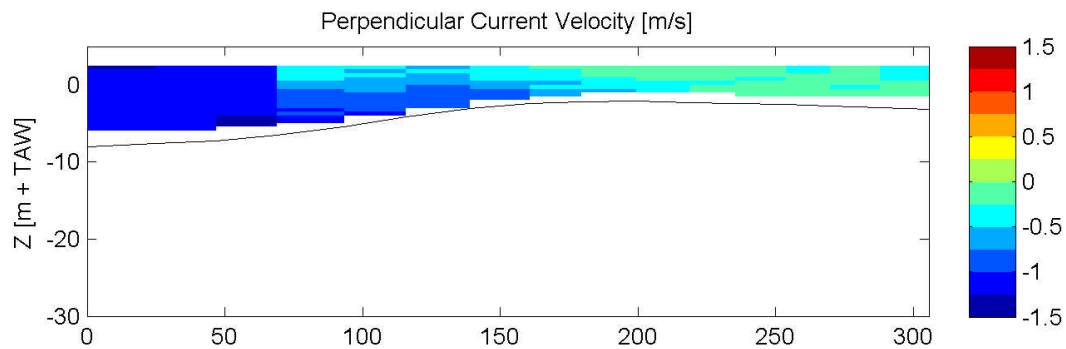
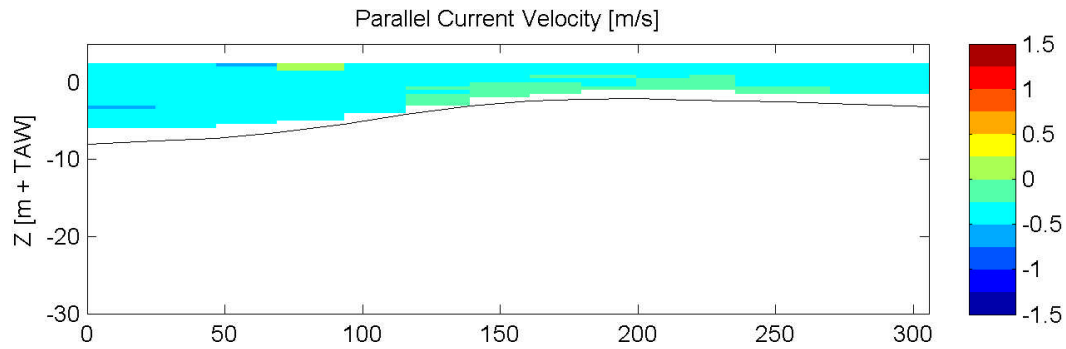
ADCP

Sourcefile:

OS080407\_08r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

14:46 - 14:48

Time after HW [HH:MM]

-1:12

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

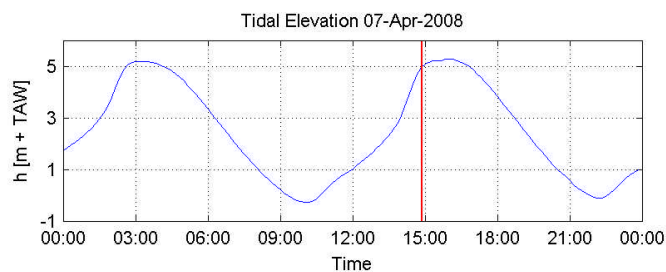
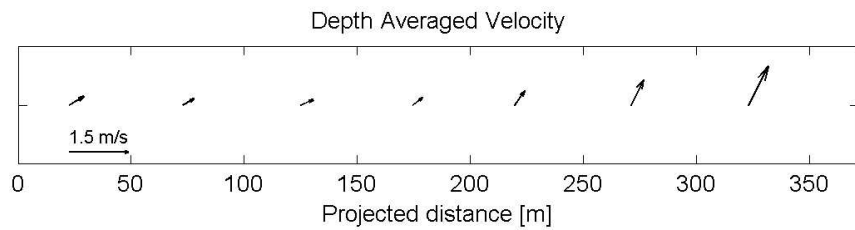
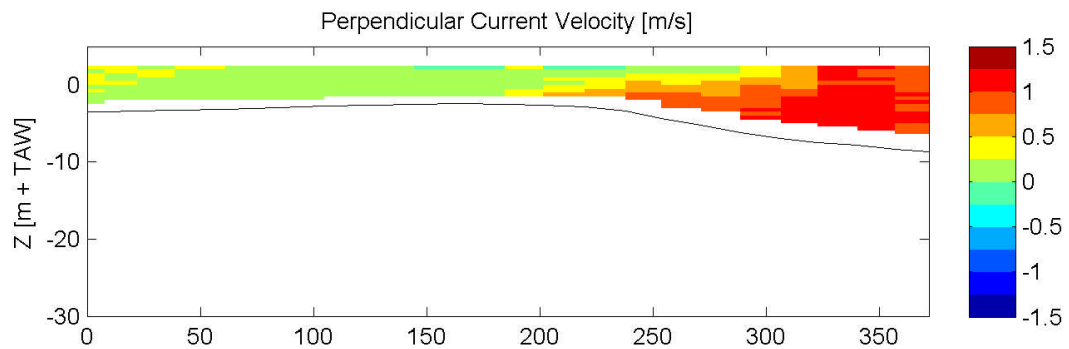
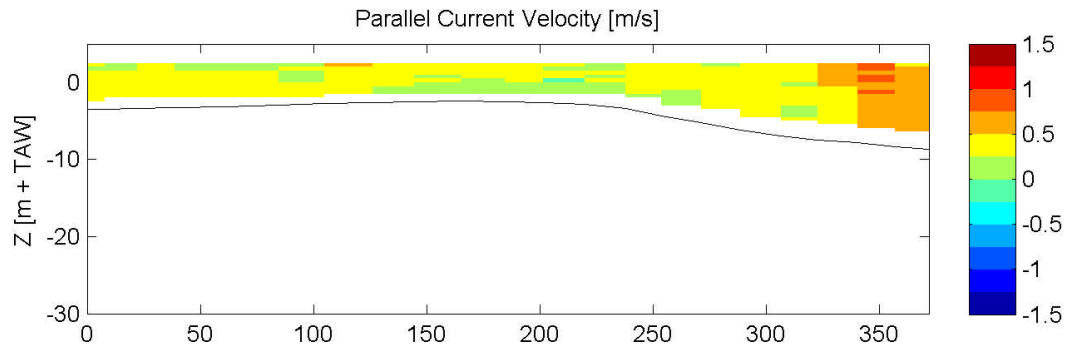
ADCP

Sourcefile:

OS080407\_09r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

14:49 - 14:52

Time after HW [HH:MM]

-1:08

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

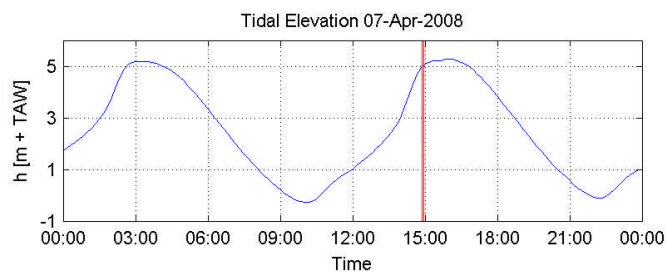
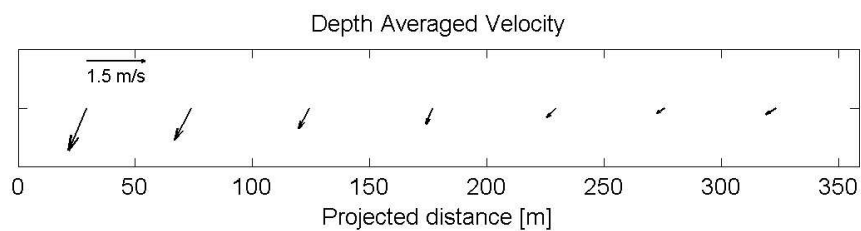
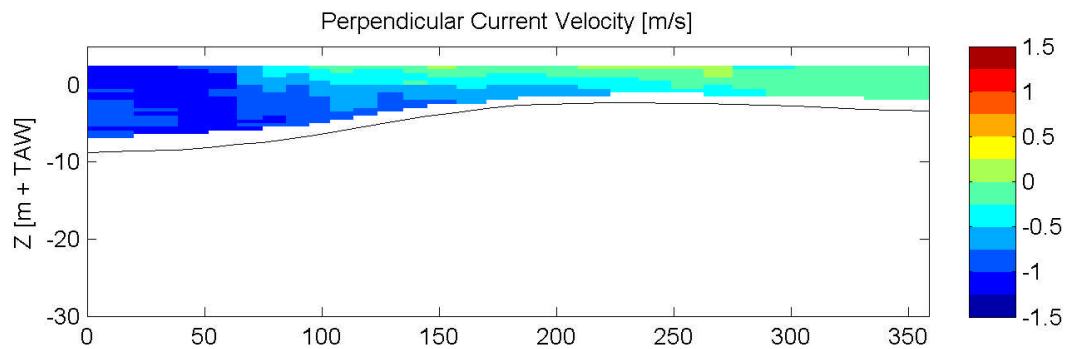
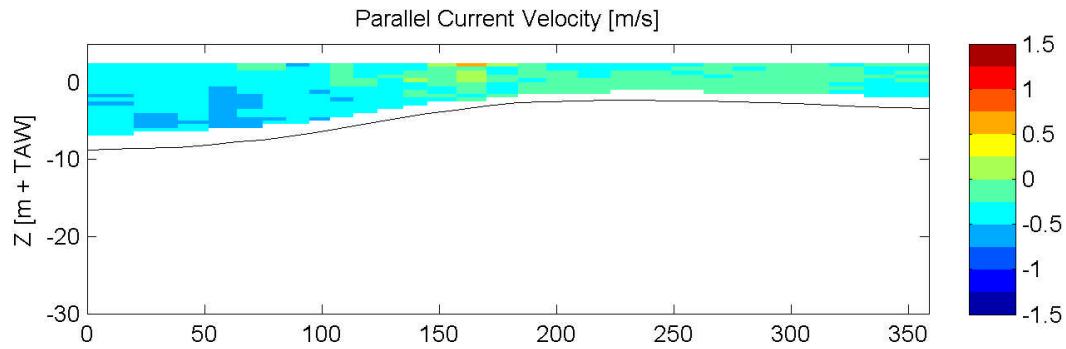
ADCP

Sourcefile:

OS080407\_10r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

14:53 - 14:57

Time after HW [HH:MM]

-1:04

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

### **D.3.6. Raai 6**

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

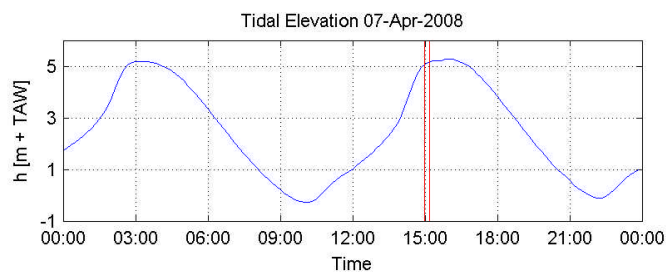
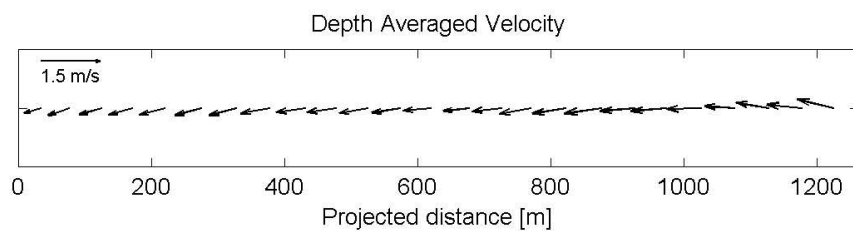
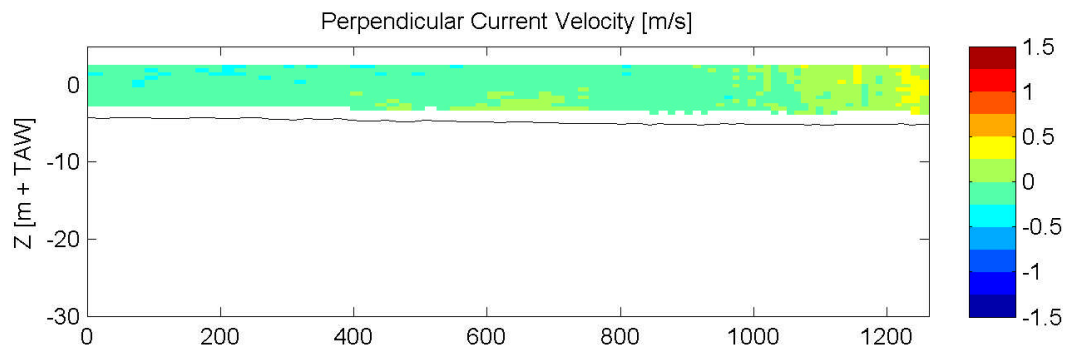
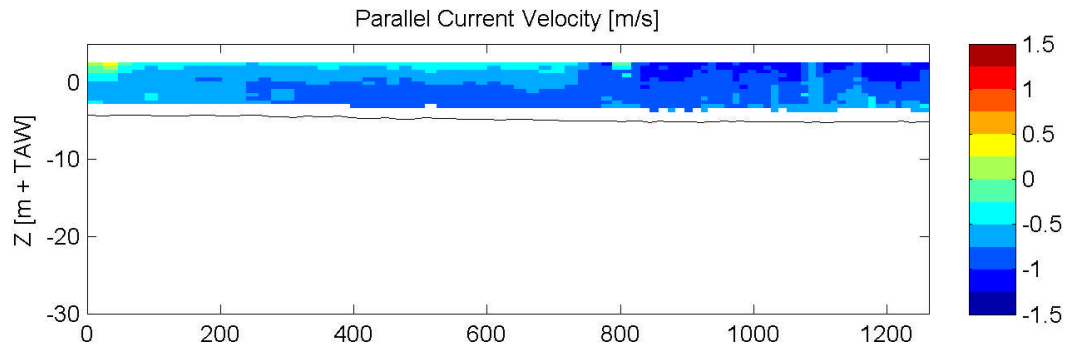
ADCP

Sourcefile:

OS080407\_11r.csv

Location:

Zuidergat dwarsraai



HW/LW: 03:10: h = 5.19 m+TAW  
10:00: h = -0.29 m+TAW  
16:00: h = 5.27 m+TAW

Date / Time [MET] :

07-Apr-2008

14:59 - 15:11

Time after HW [HH:MM]

-0:54

Data Processed by:



In association with:

I/RA/11313/08.045/YDK

## **D.4 Langsraai 08/04/08**



# Factual data Report meetcampagne Ossenisse 03-04/2008

11313

Equipment(s):

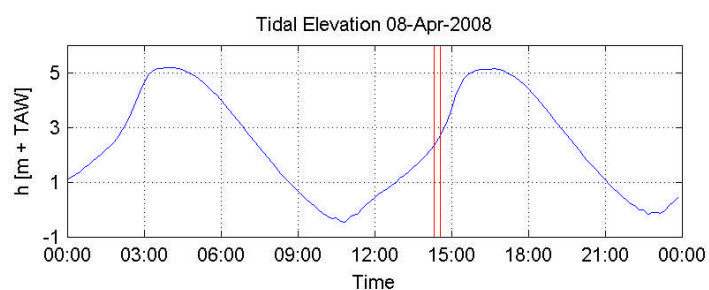
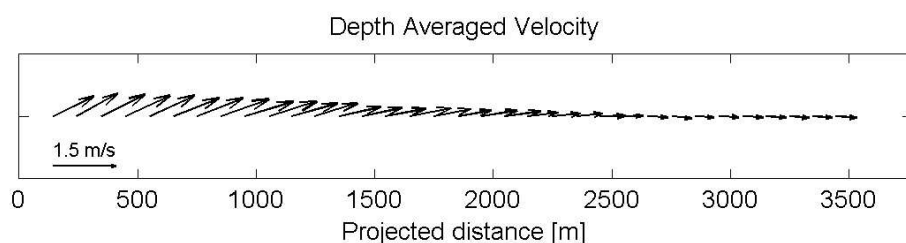
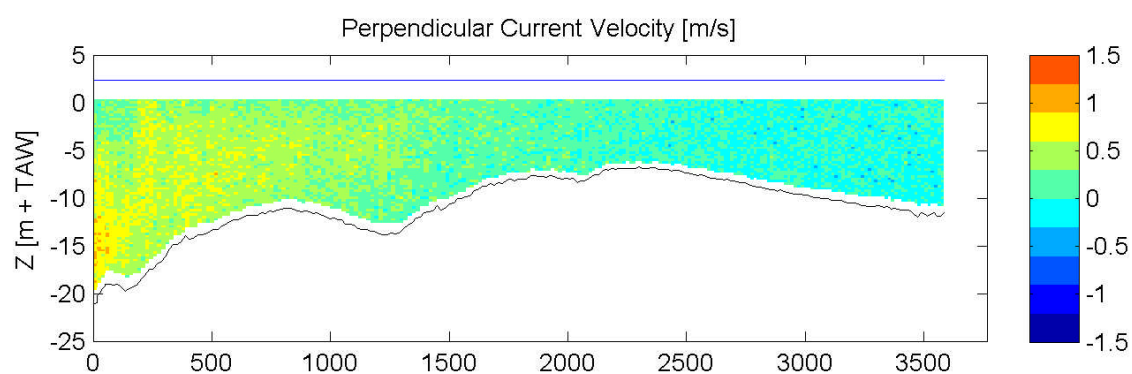
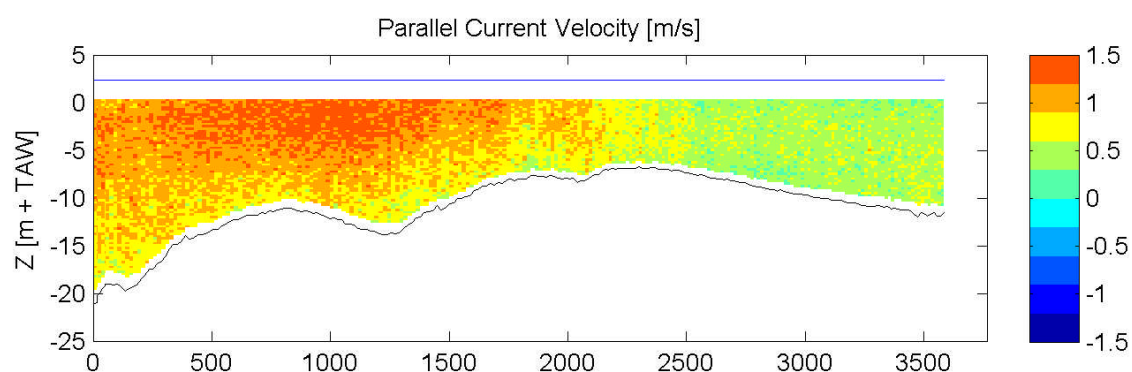
ADCP

Sourcefile:

0381027.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

14:19 - 14:34

Time after HW [HH:MM]

-2:13

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossenissee 03-04/2008

11313

Equipment(s):

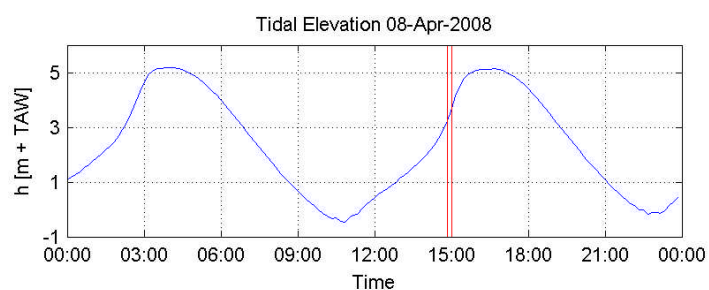
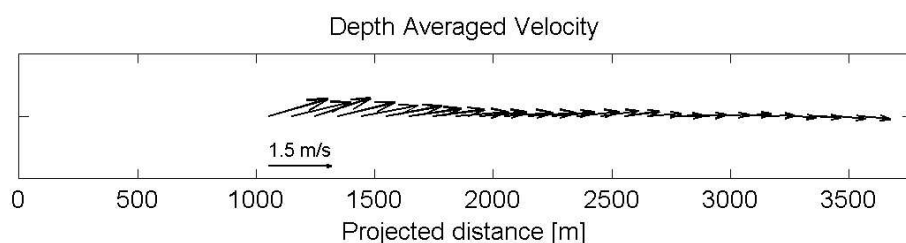
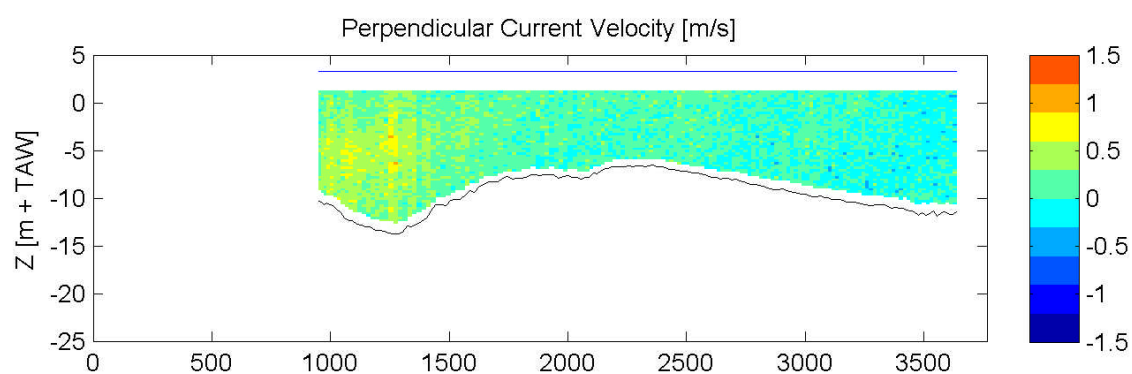
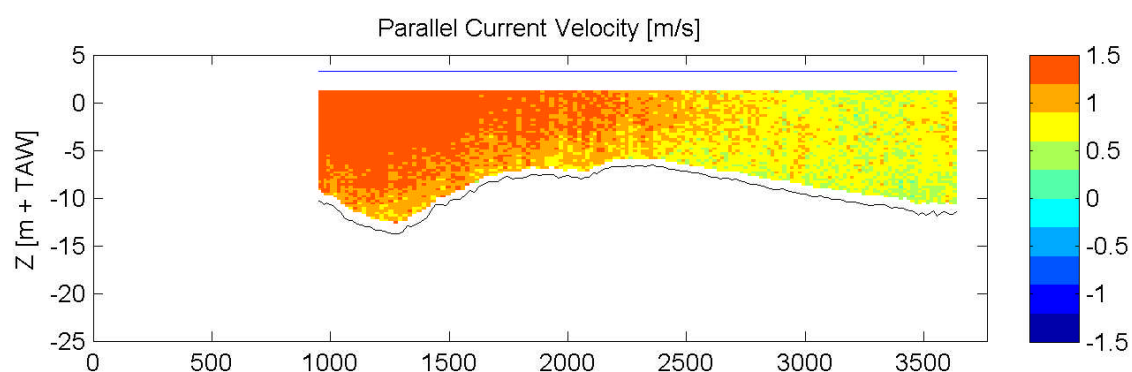
ADCP

Sourcefile:

0381029.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

14:50 - 15:00

Time after HW [HH:MM]

-1:44

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

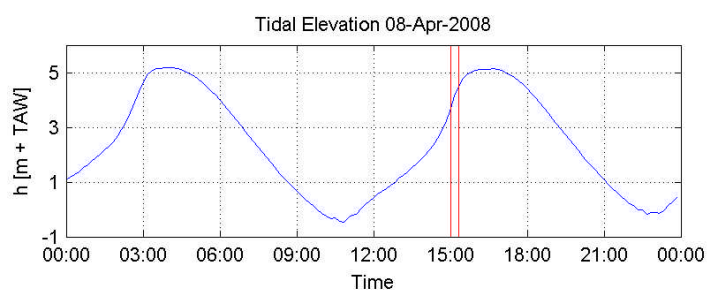
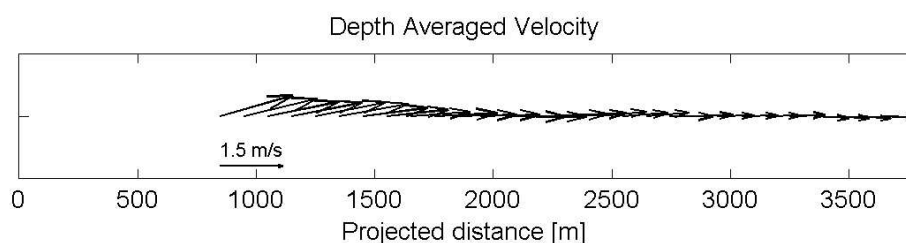
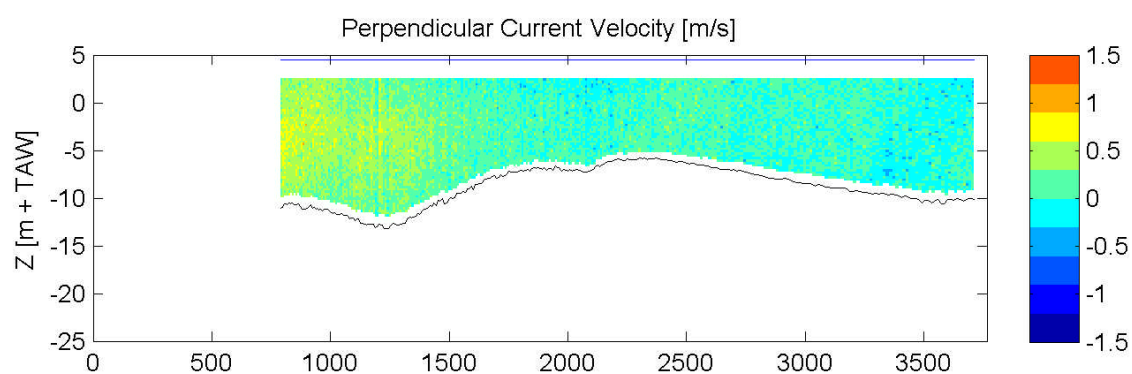
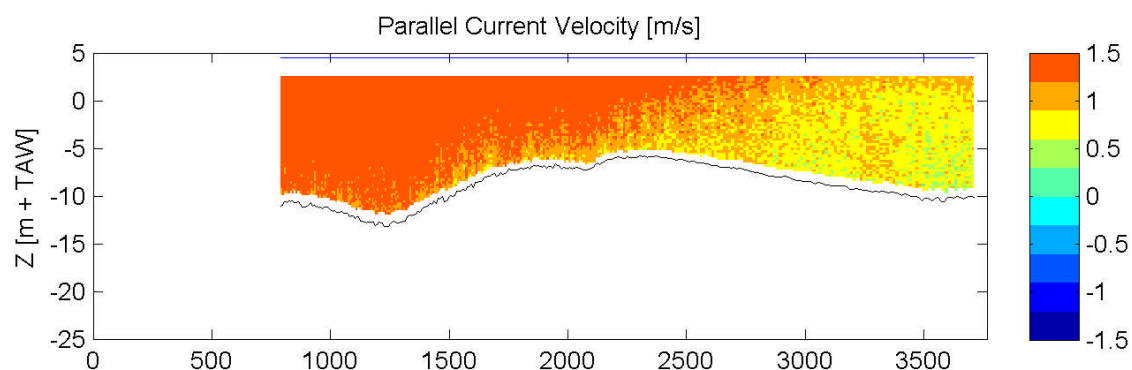
ADCP

Sourcefile:

0381030.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:19 - 15:00

Time after HW [HH:MM]

-1:29

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

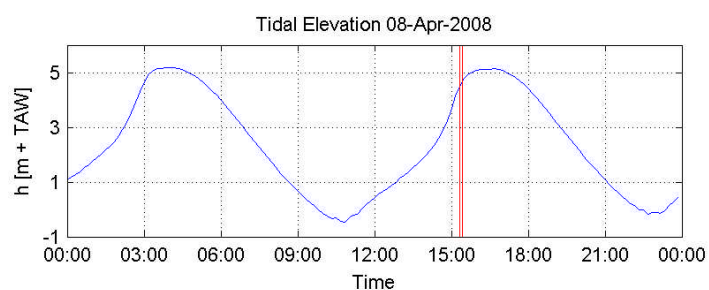
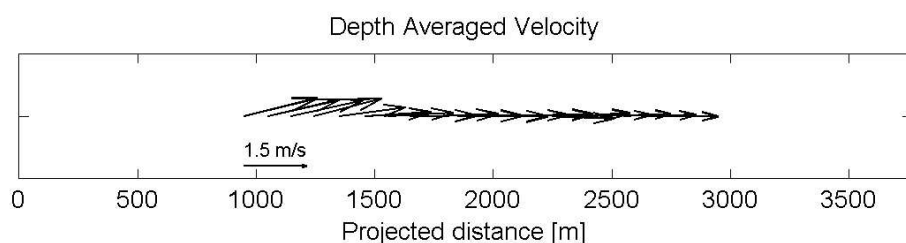
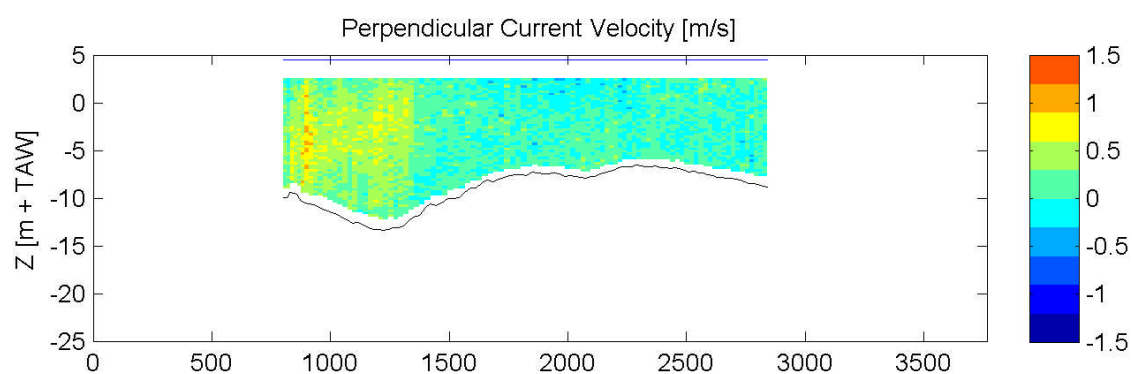
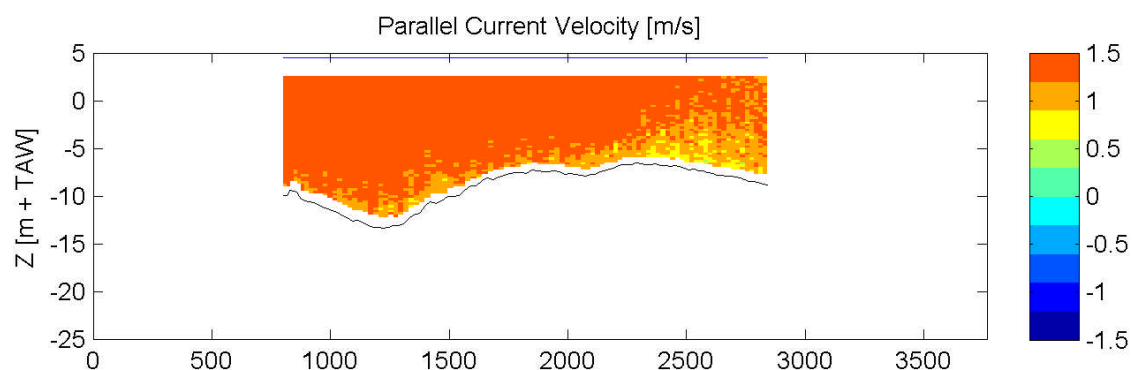
Equipment(s):  
ADCP

Sourcefile:

0381031.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:19 - 15:26

Time after HW [HH:MM]

-1:16

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossenisse 03-04/2008

11313

Equipment(s):

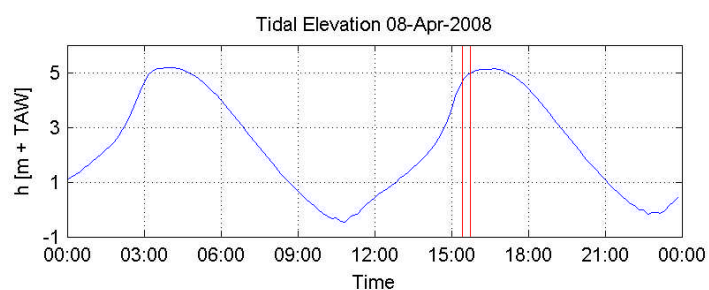
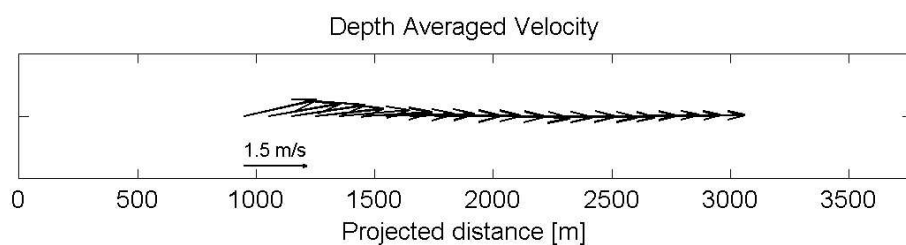
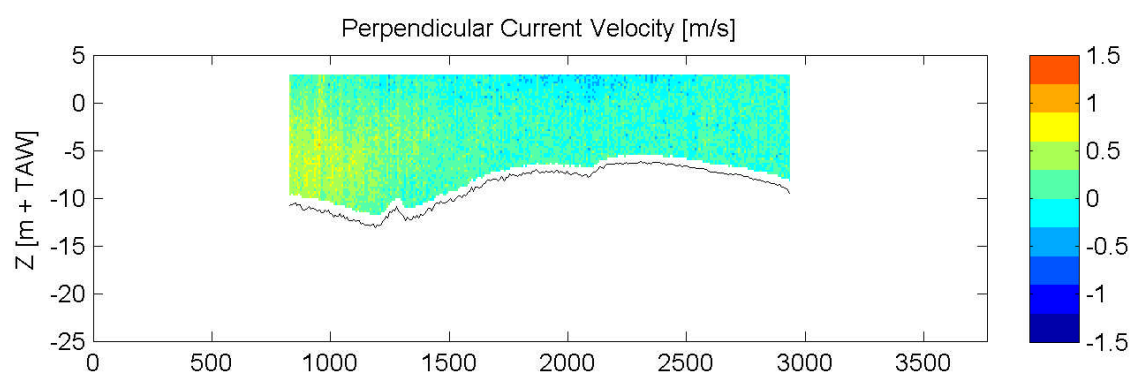
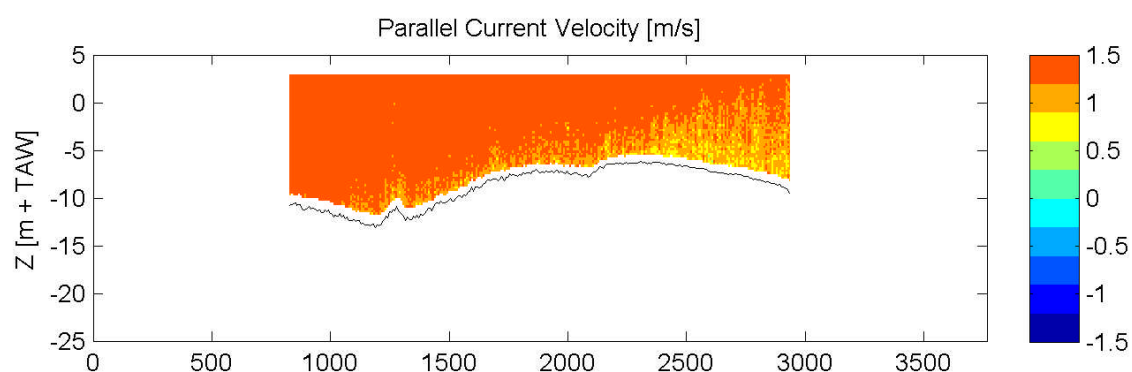
ADCP

Sourcefile:

0381032.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:44 - 15:26

Time after HW [HH:MM]

-1:04

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossenis 03-04/2008

11313

Equipment(s):

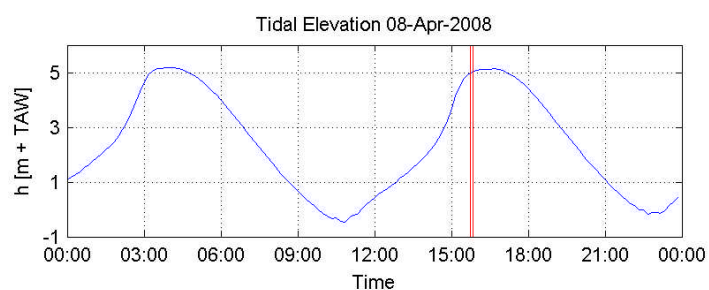
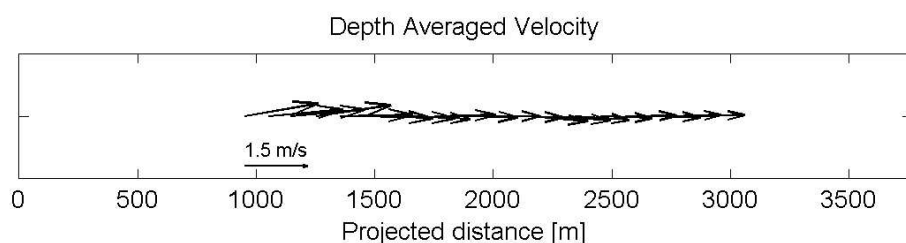
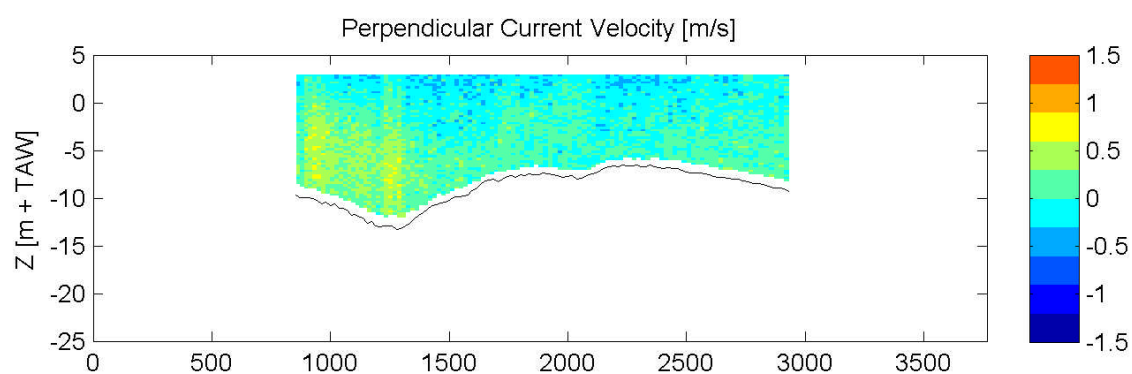
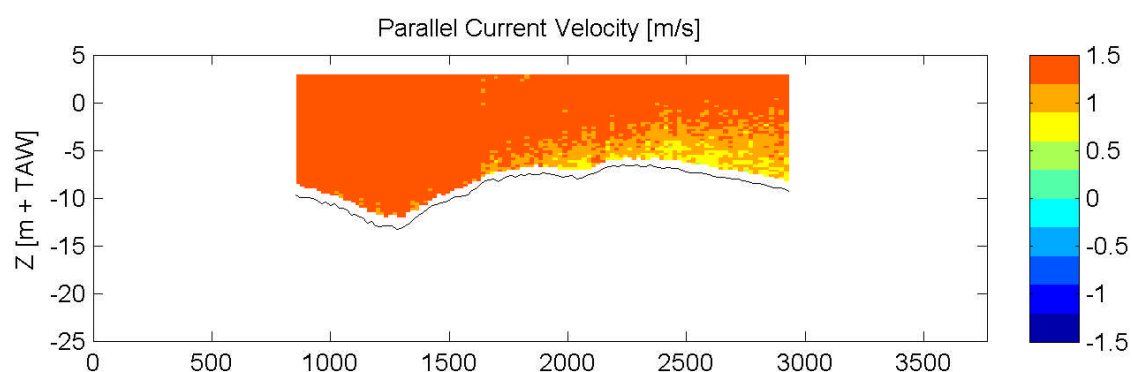
ADCP

Sourcefile:

0381033.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

15:44 - 15:51

Time after HW [HH:MM]

-0:51

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossenisse 03-04/2008

11313

Equipment(s):

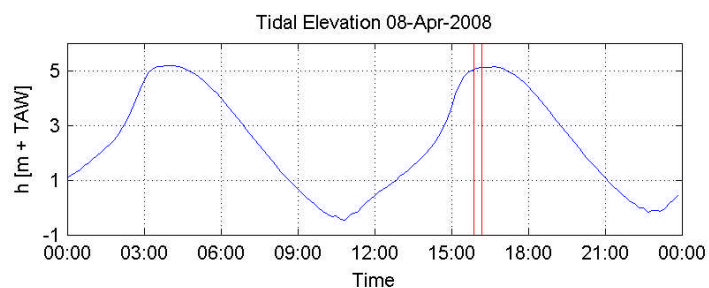
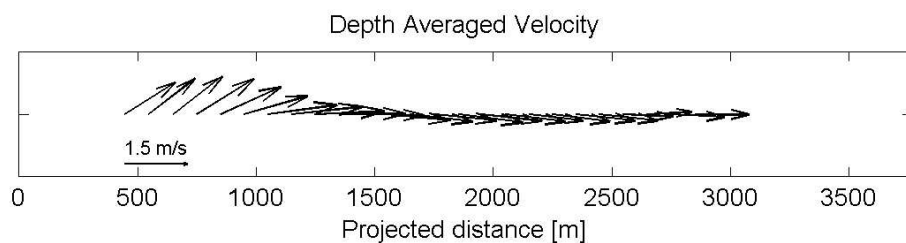
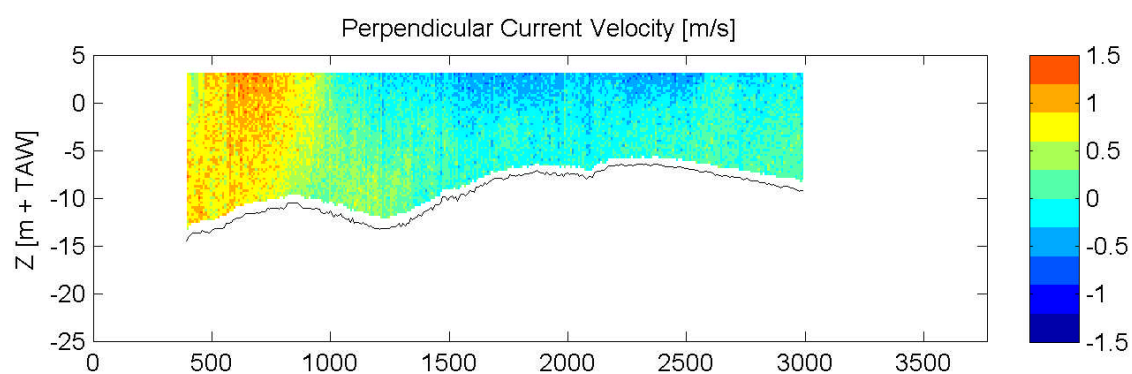
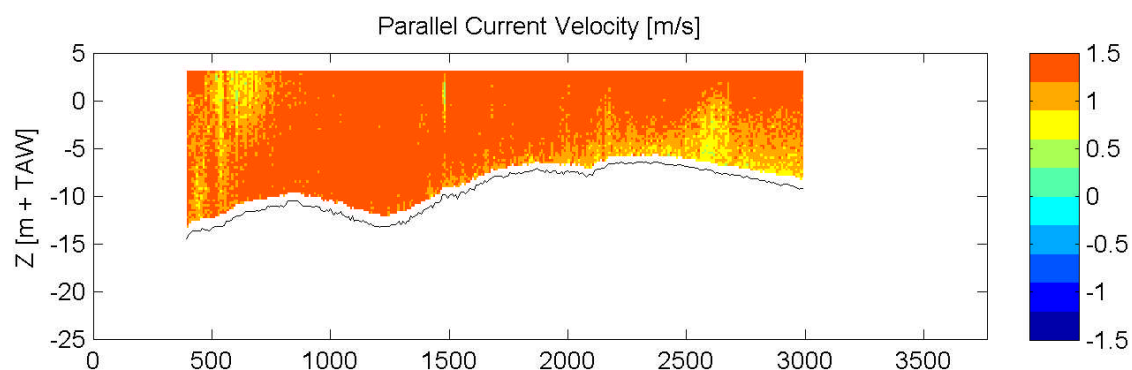
ADCP

Sourcefile:

0381034.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:11 - 15:52

Time after HW [HH:MM]

-0:38

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

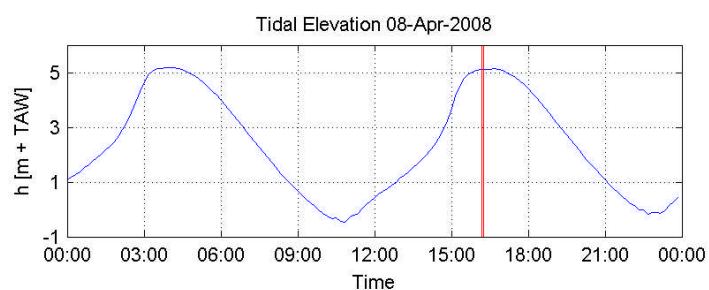
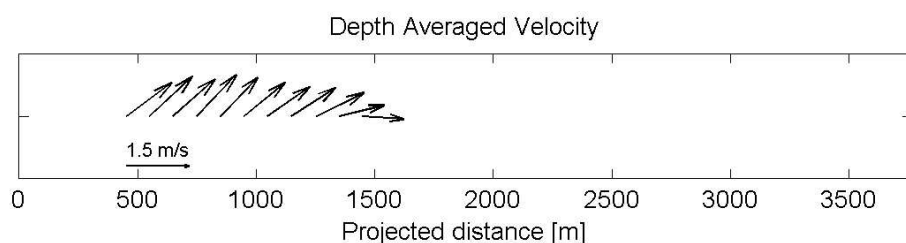
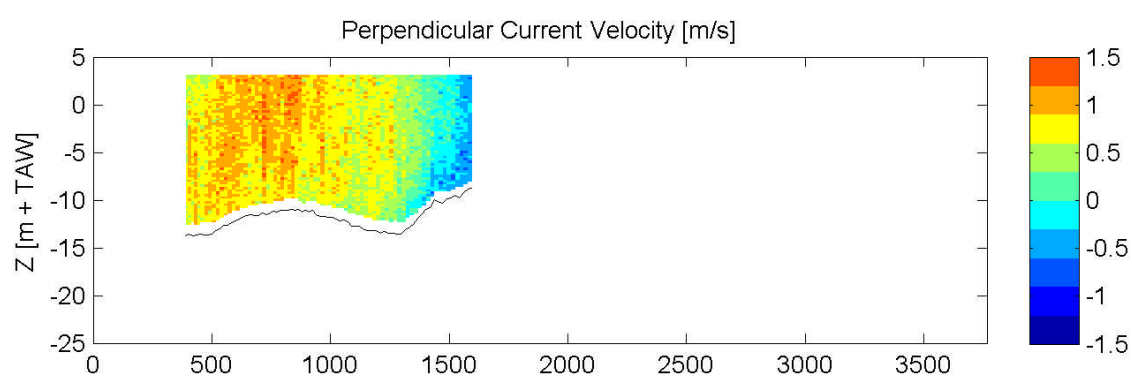
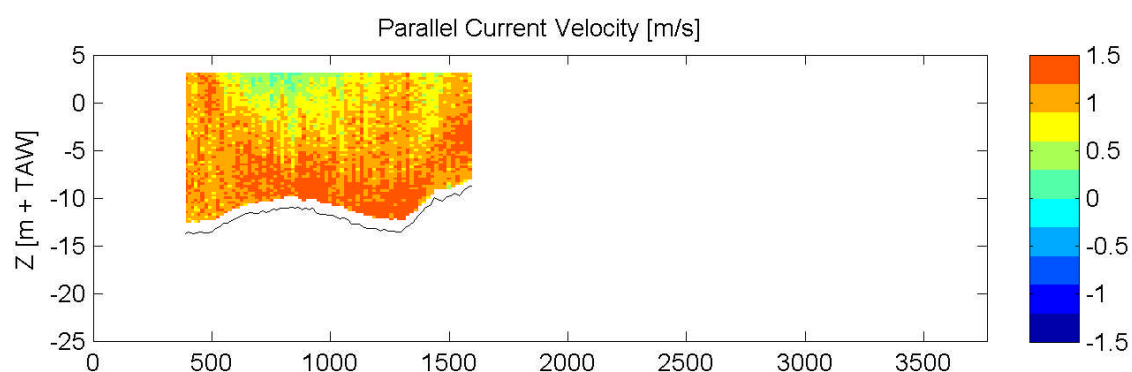
ADCP

Sourcefile:

0381035.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:11 - 16:16

Time after HW [HH:MM]

-0:25

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossenissee 03-04/2008

11313

Equipment(s):

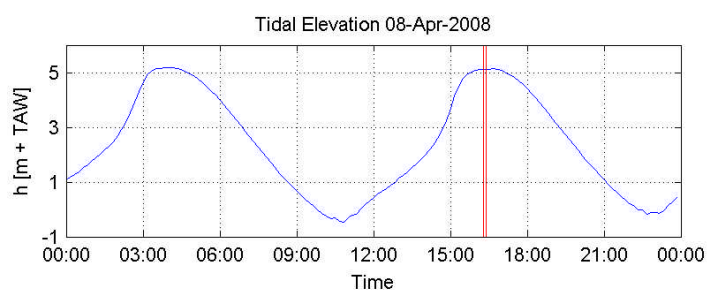
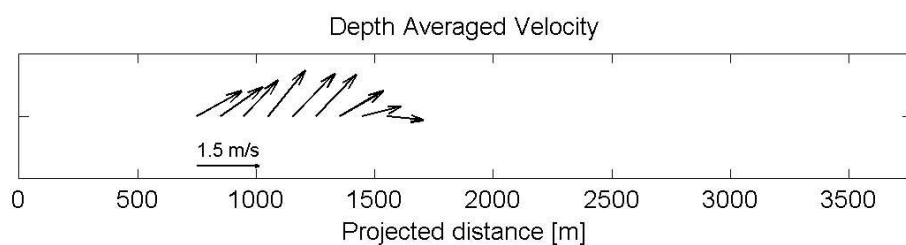
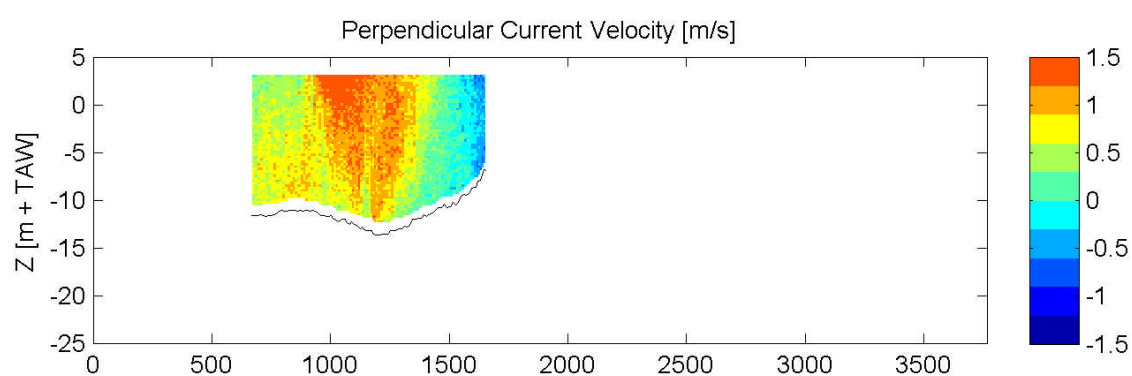
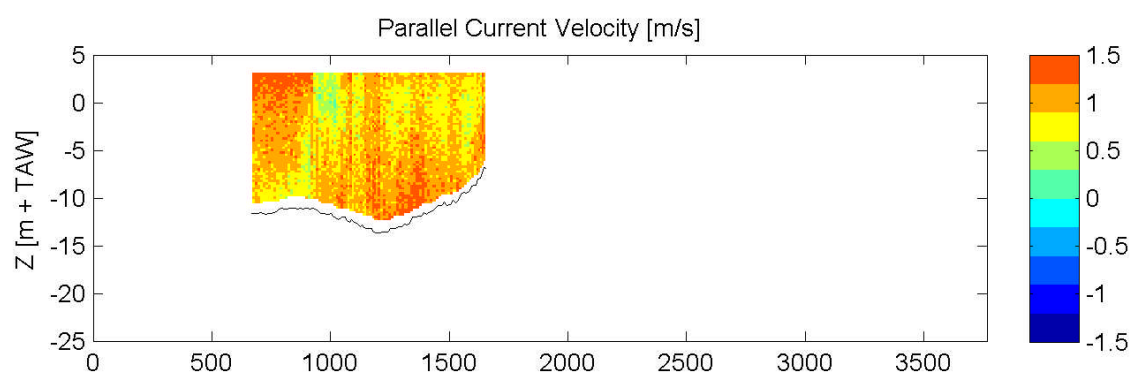
ADCP

Sourcefile:

0381036.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:23 - 16:17

Time after HW [HH:MM]

-0:19

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossenisse 03-04/2008

11313

Equipment(s):

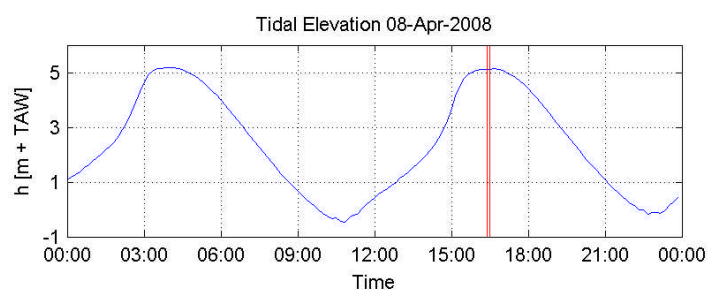
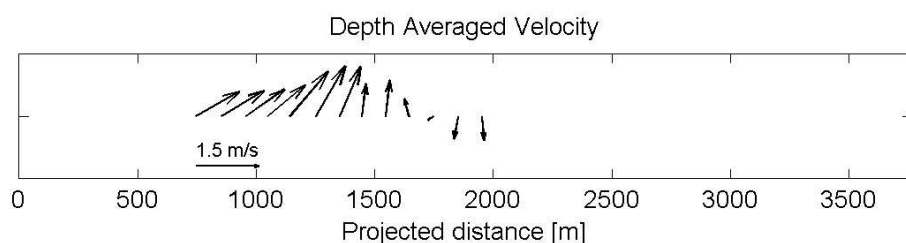
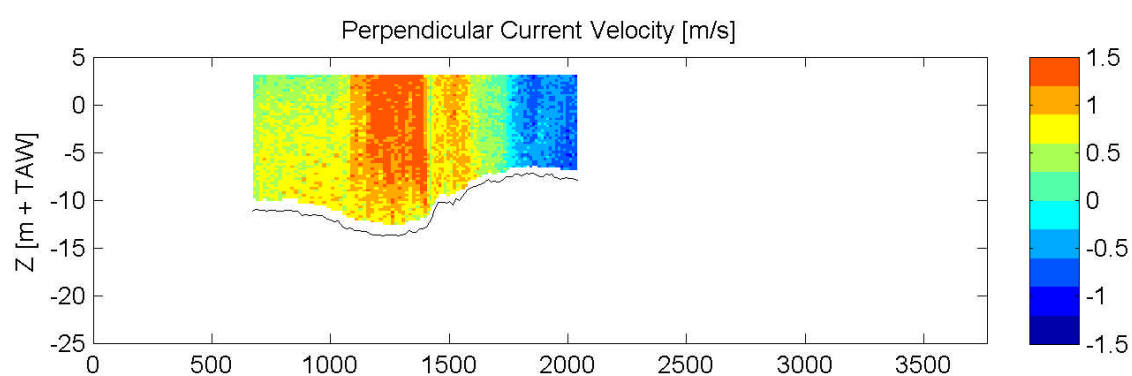
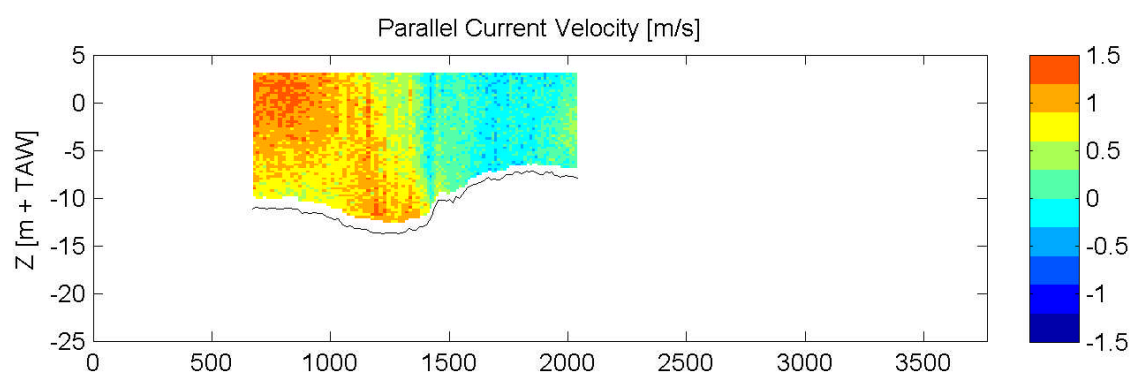
ADCP

Sourcefile:

0381037.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:23 - 16:30

Time after HW [HH:MM]

-0:13

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

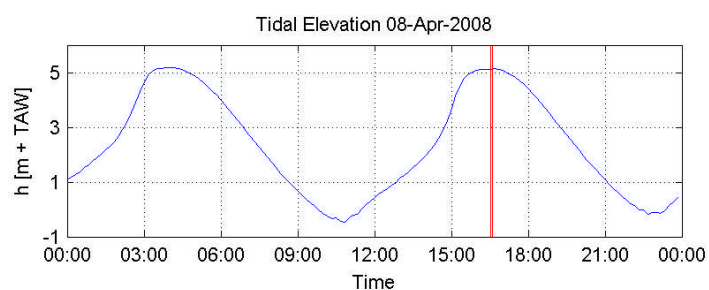
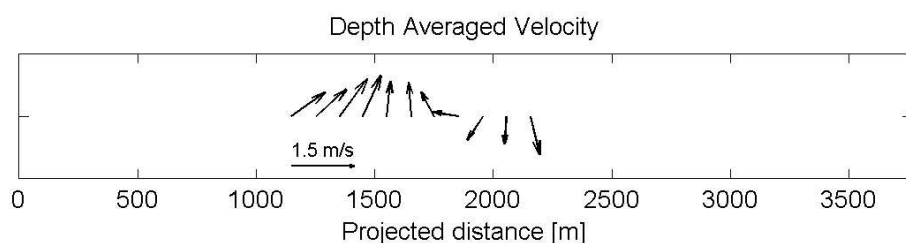
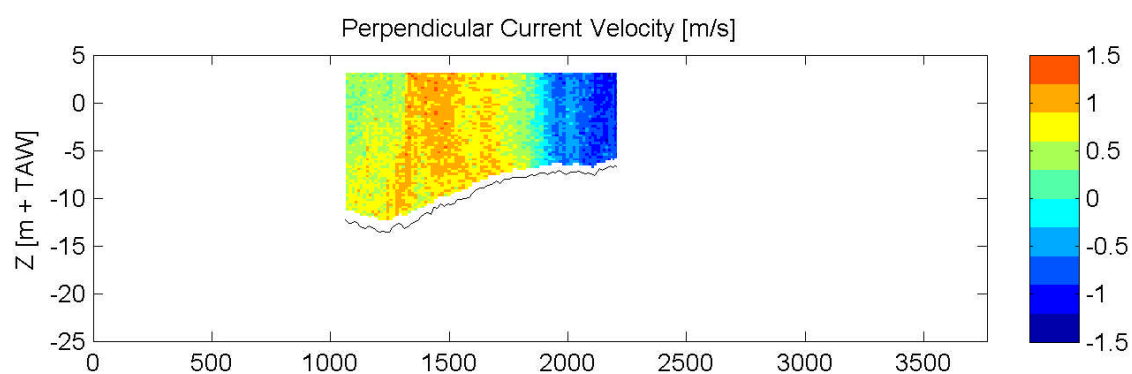
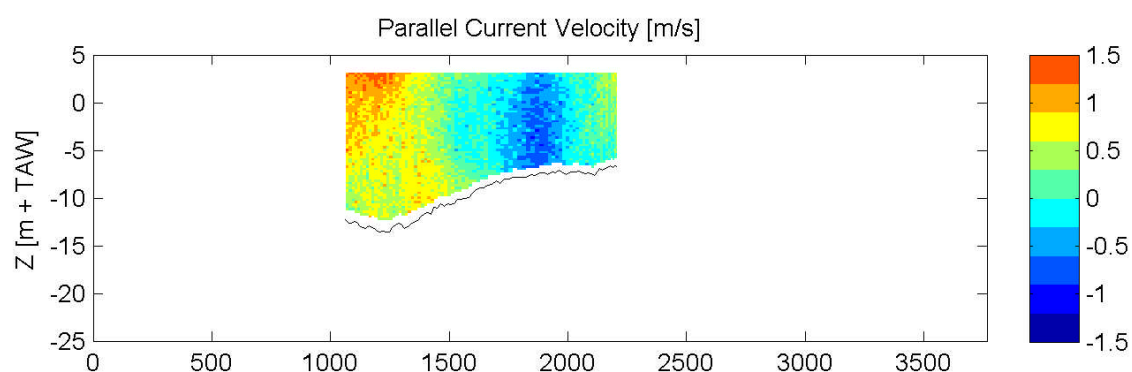
ADCP

Sourcefile:

0381038.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:36 - 16:31

Time after HW [HH:MM]

-0:06

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossenis 03-04/2008

11313

Equipment(s):

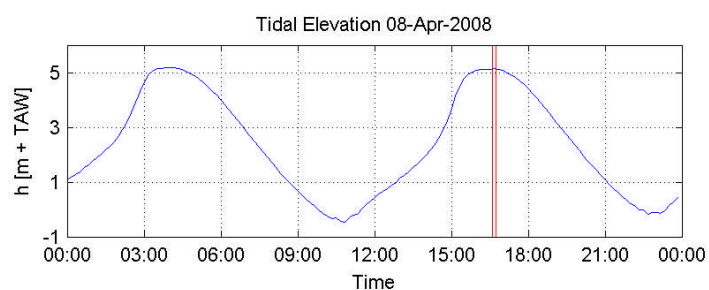
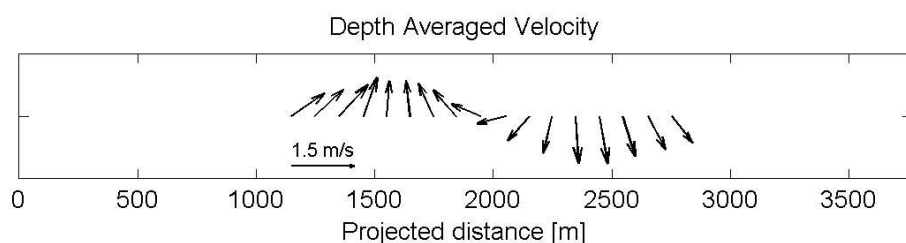
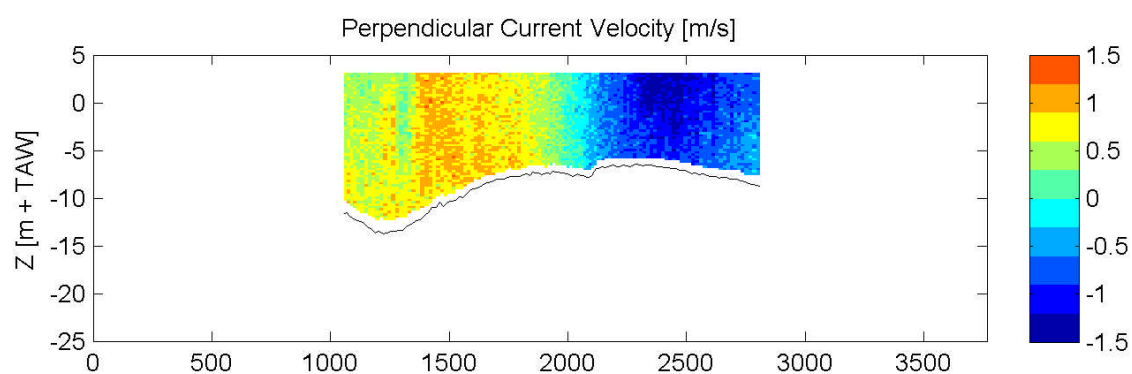
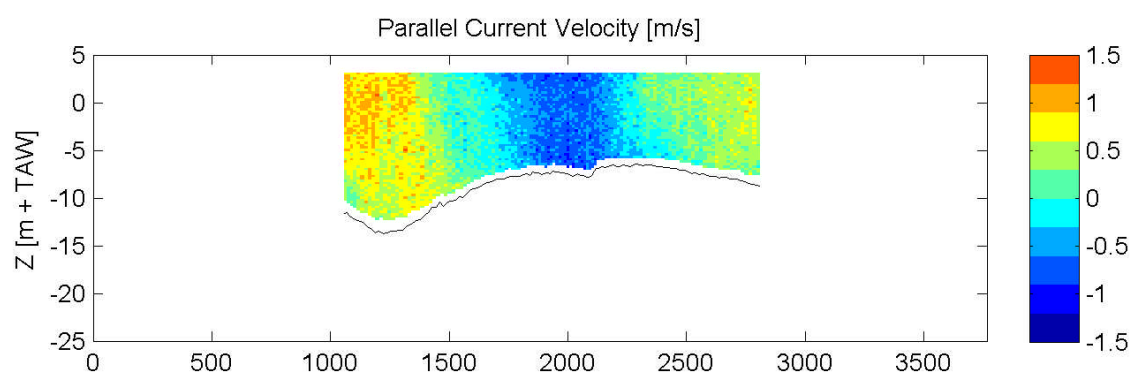
ADCP

Sourcefile:

0381039.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:36 - 16:44

Time after HW [HH:MM]

0:00

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossenisse 03-04/2008

11313

Equipment(s):

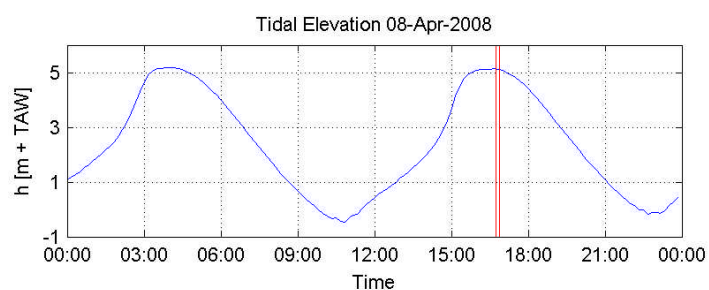
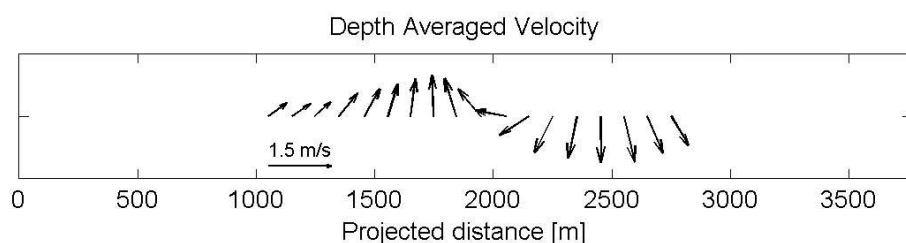
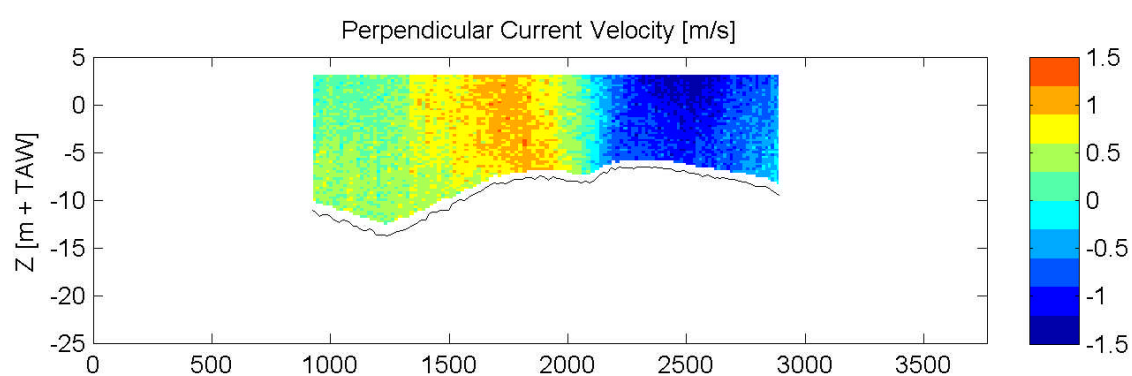
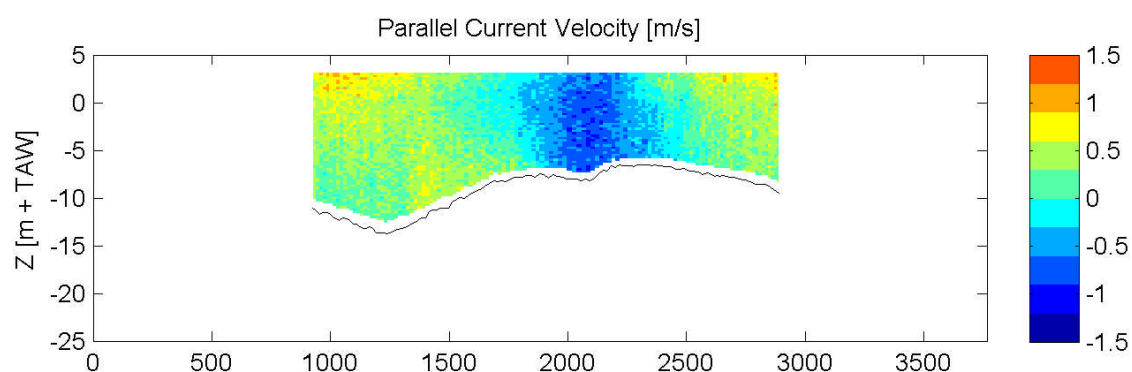
ADCP

Sourcefile:

0381040.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:53 - 16:45

Time after HW [HH:MM]

0:09

Data Processed by:



In association with :

I/RA/11313/08.045/YDK

# Factual data Report meetcampagne Ossensisse 03-04/2008

11313

Equipment(s):

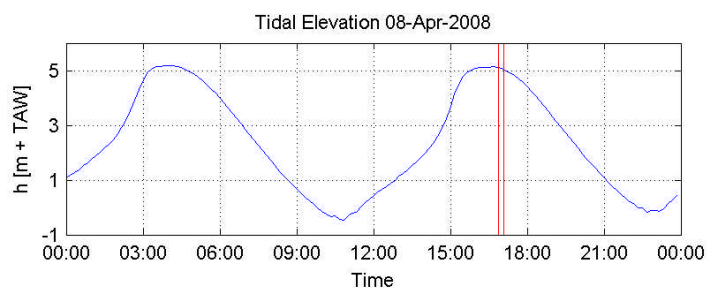
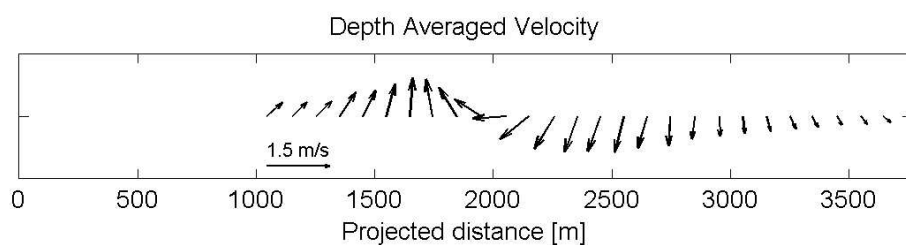
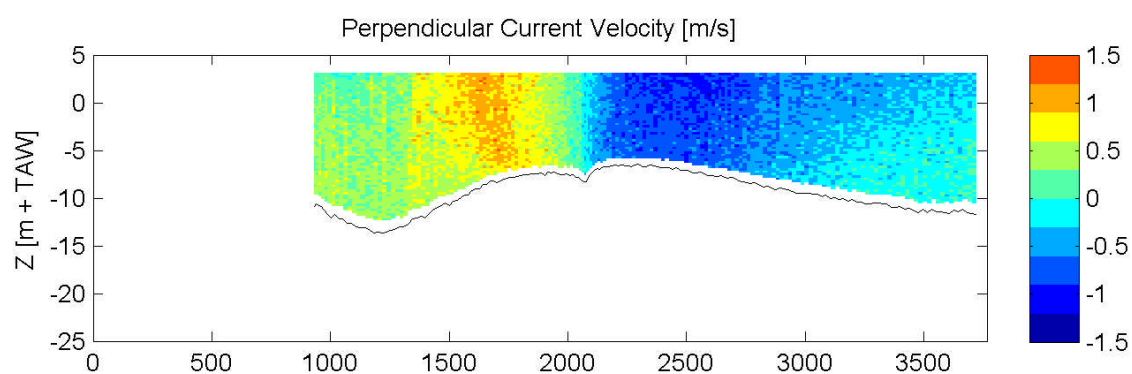
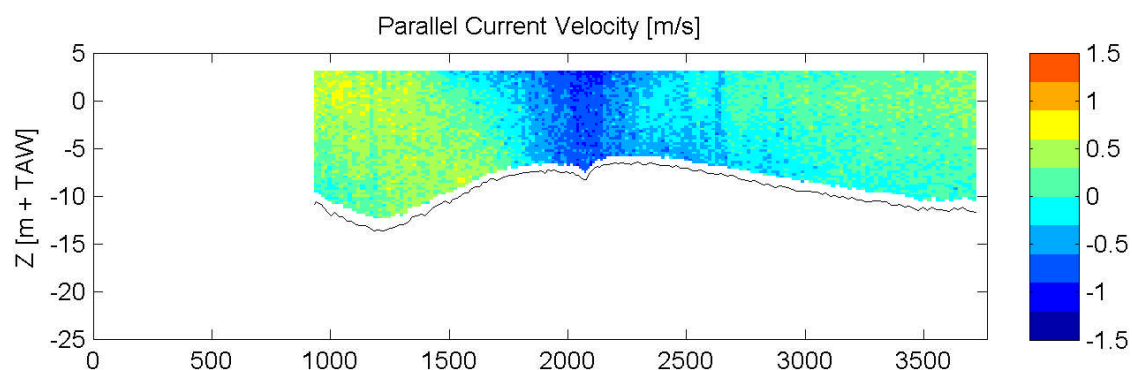
ADCP

Sourcefile:

0381041.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

16:53 - 17:05

Time after HW [HH:MM]

0:19

Data Processed by:



In association with :

I/RA/11313/08.045/YDK



# Factual data Report meetcampagne Ossenissee 03-04/2008

11313

Equipment(s):

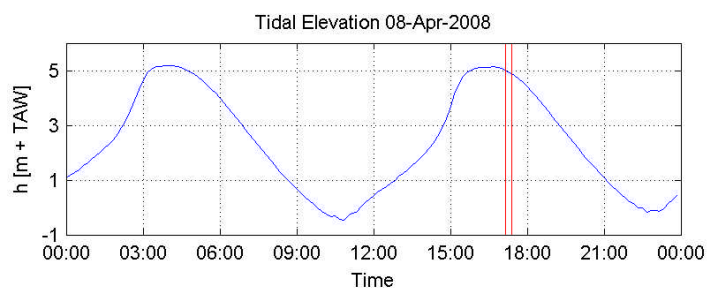
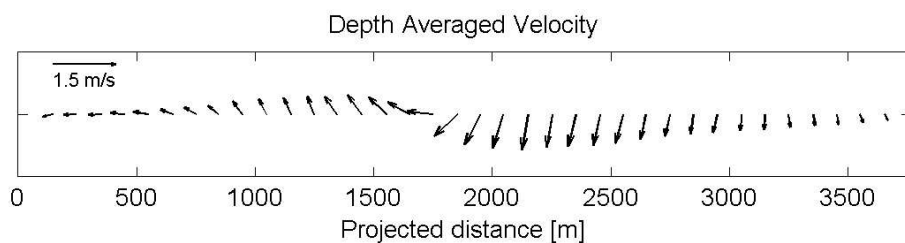
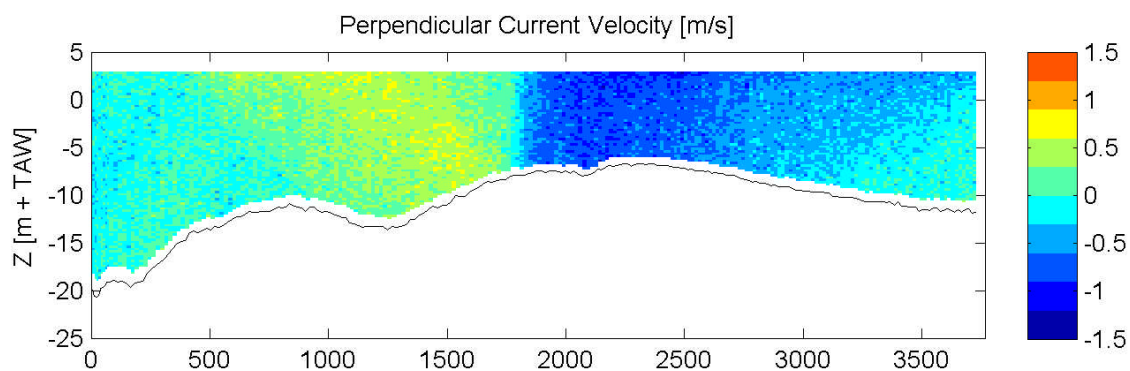
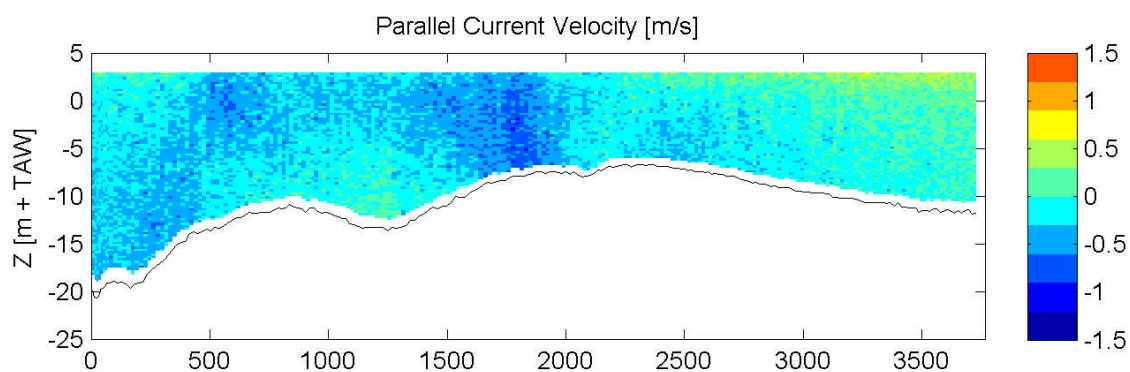
ADCP

Sourcefile:

0381042.csv

Location:

Zuidergat langsraai



HW/LW: 04:00: h = 5.17 m+TAW  
10:50: h = -0.46 m+TAW  
16:40: h = 5.13 m+TAW

Date / Time [MET] :

08-Apr-2008

17:23 - 17:08

Time after HW [HH:MM]

0:36

Data Processed by:



In association with :

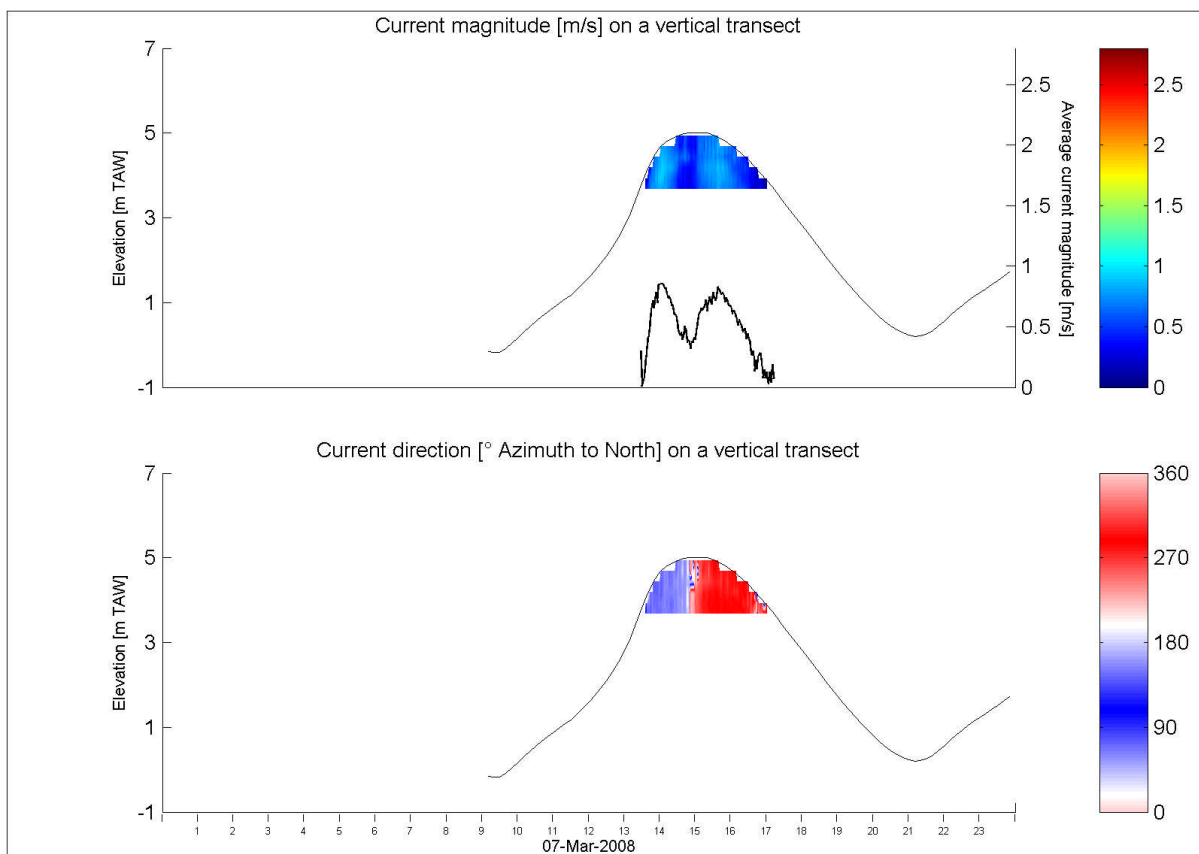
I/RA/11313/08.045/YDK

## **APPENDIX E.**

### **SNELHEIDSPROFIEL (STATIONAIRE ADCP)**

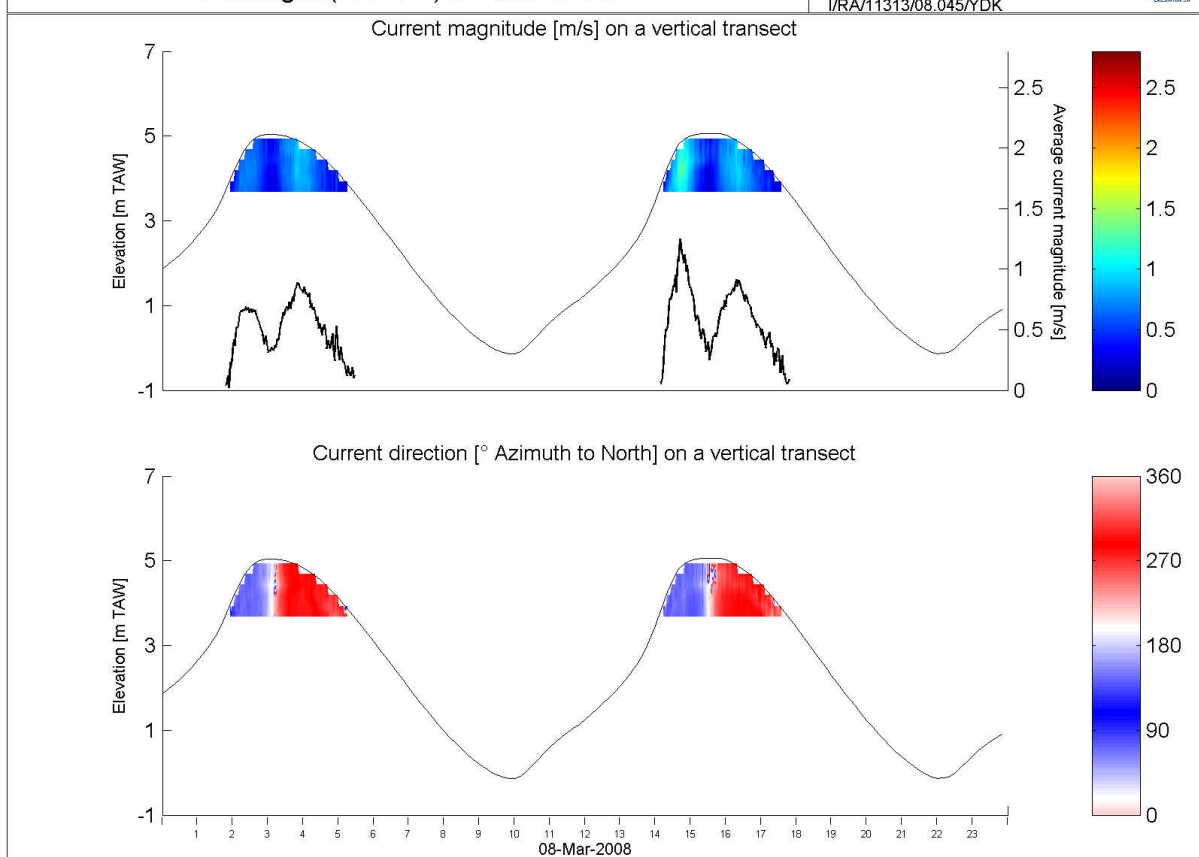


## **E.1 ADCP1**



Zuidergat (ADCP1) 07-Mar-2008

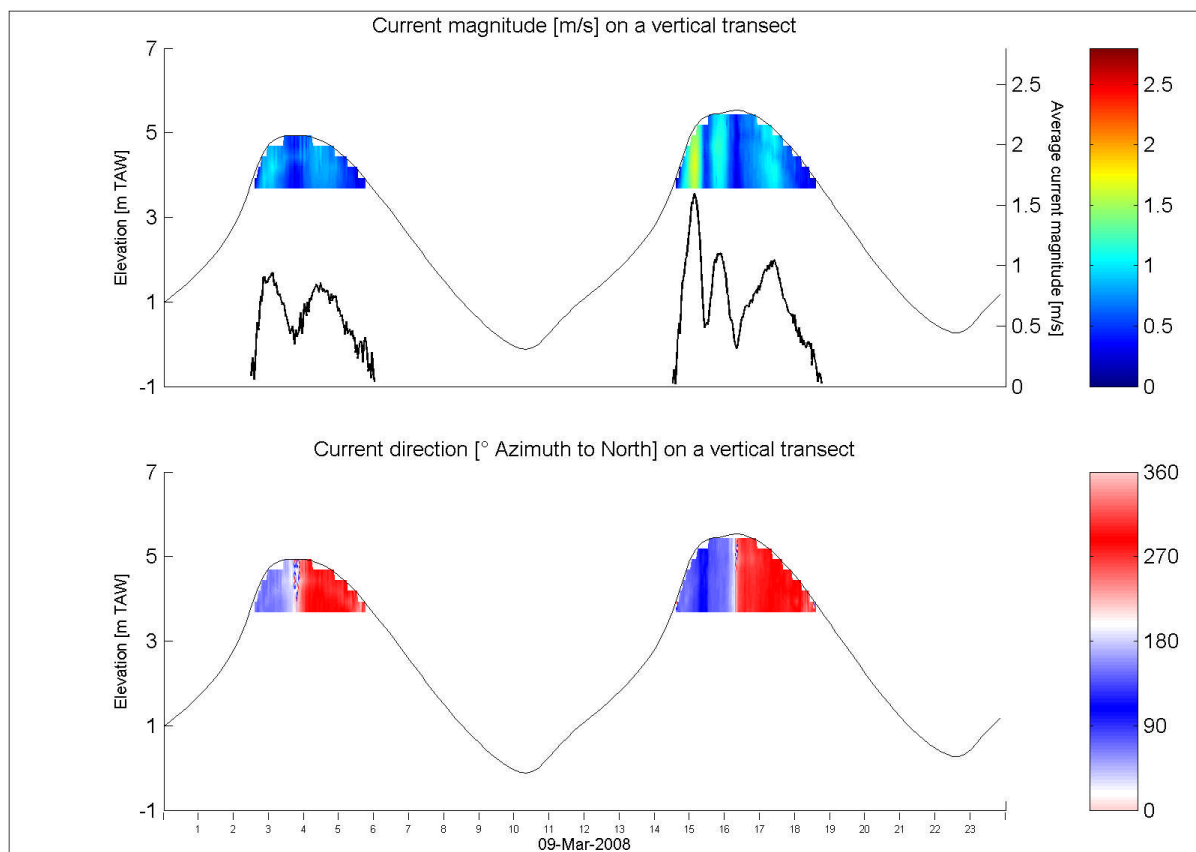
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 08-Mar-2008

Processed by:  
I/RA/11313/08.045/YDK

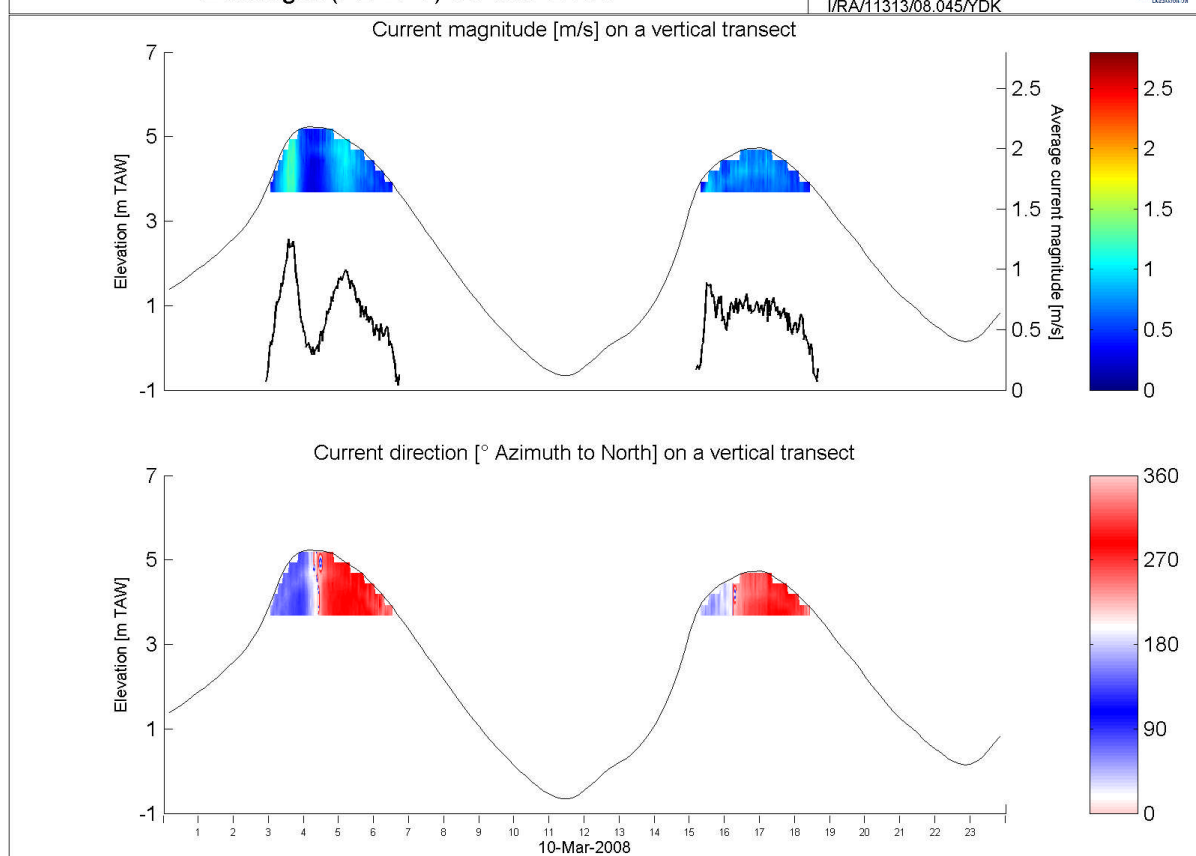




Zuidergat (ADCP1) 09-Mar-2008

Processed by:

I/RA/11313/08.045/YDK

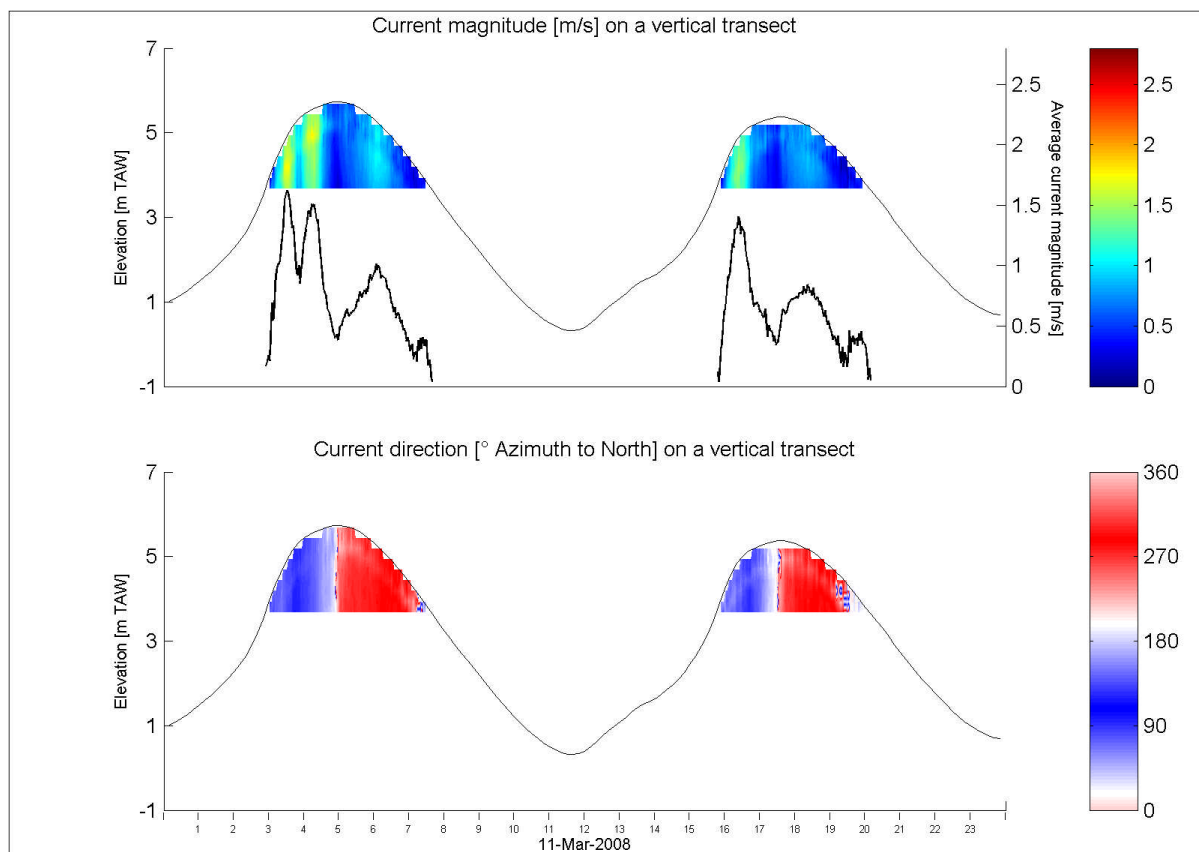


Zuidergat (ADCP1) 10-Mar-2008

Processed by:

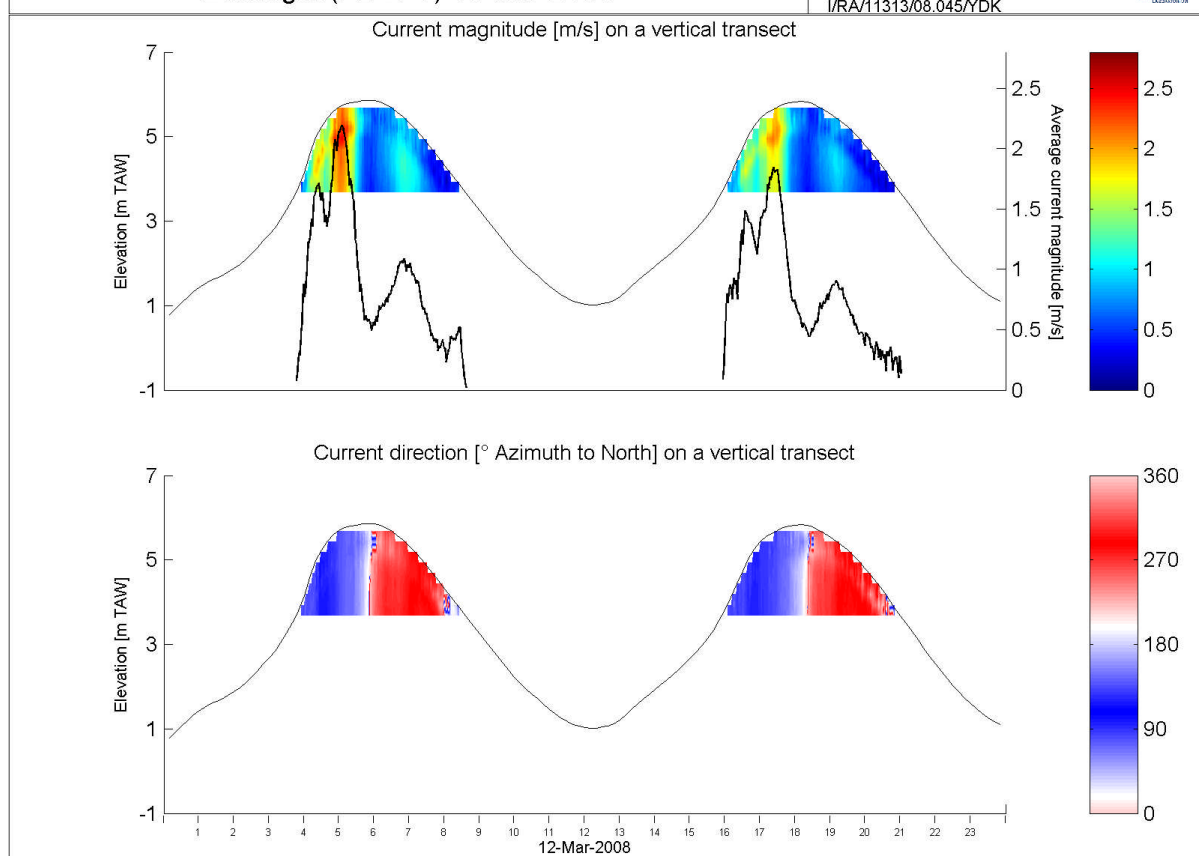
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 11-Mar-2008

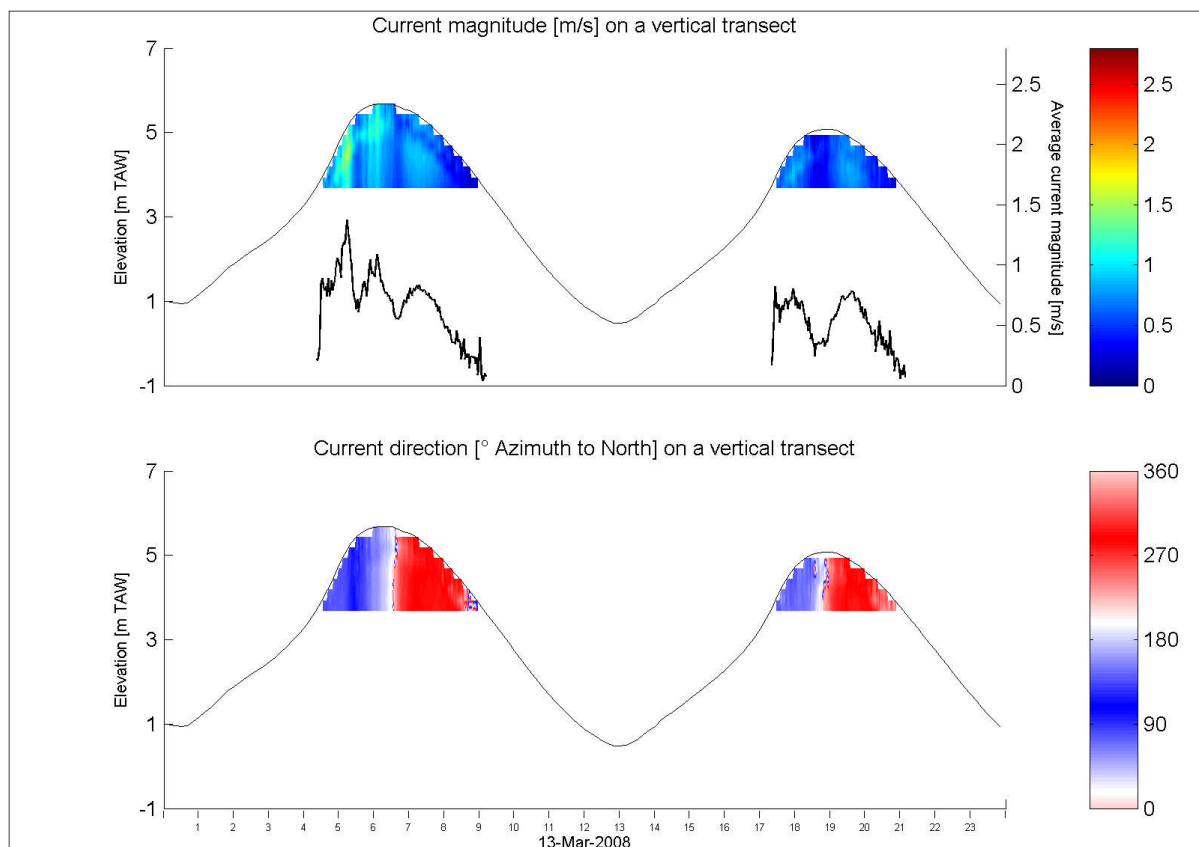
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 12-Mar-2008

Processed by:  
I/RA/11313/08.045/YDK

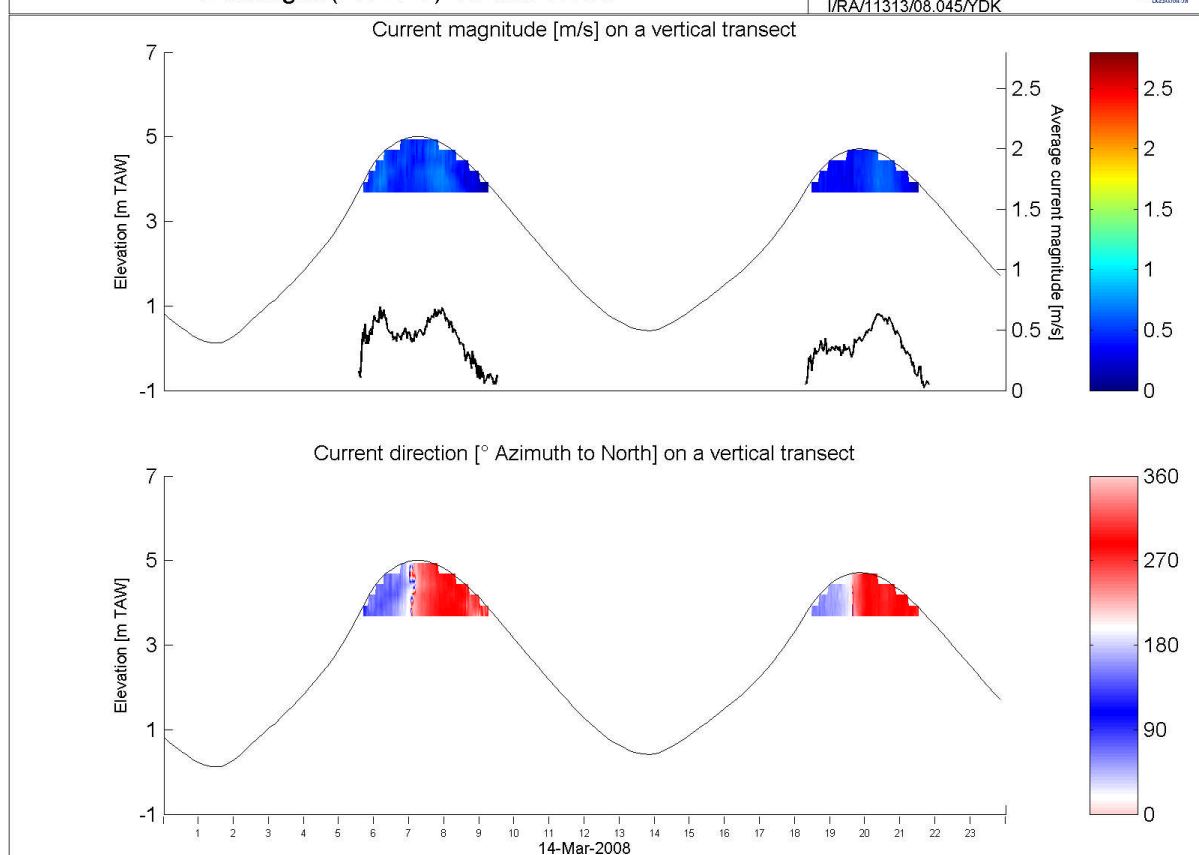




Zuidergat (ADCP1) 13-Mar-2008

Processed by:

I/RA/11313/08.045/YDK

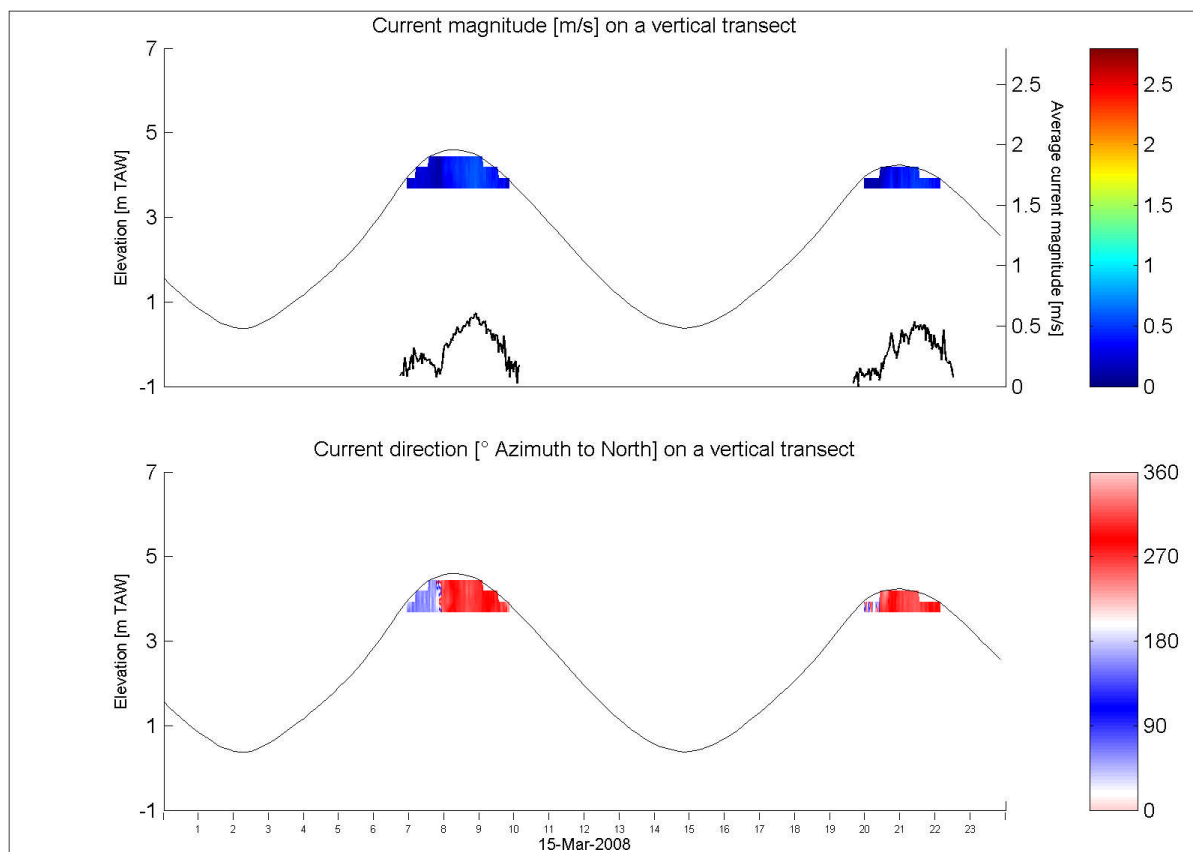


Zuidergat (ADCP1) 14-Mar-2008

Processed by:

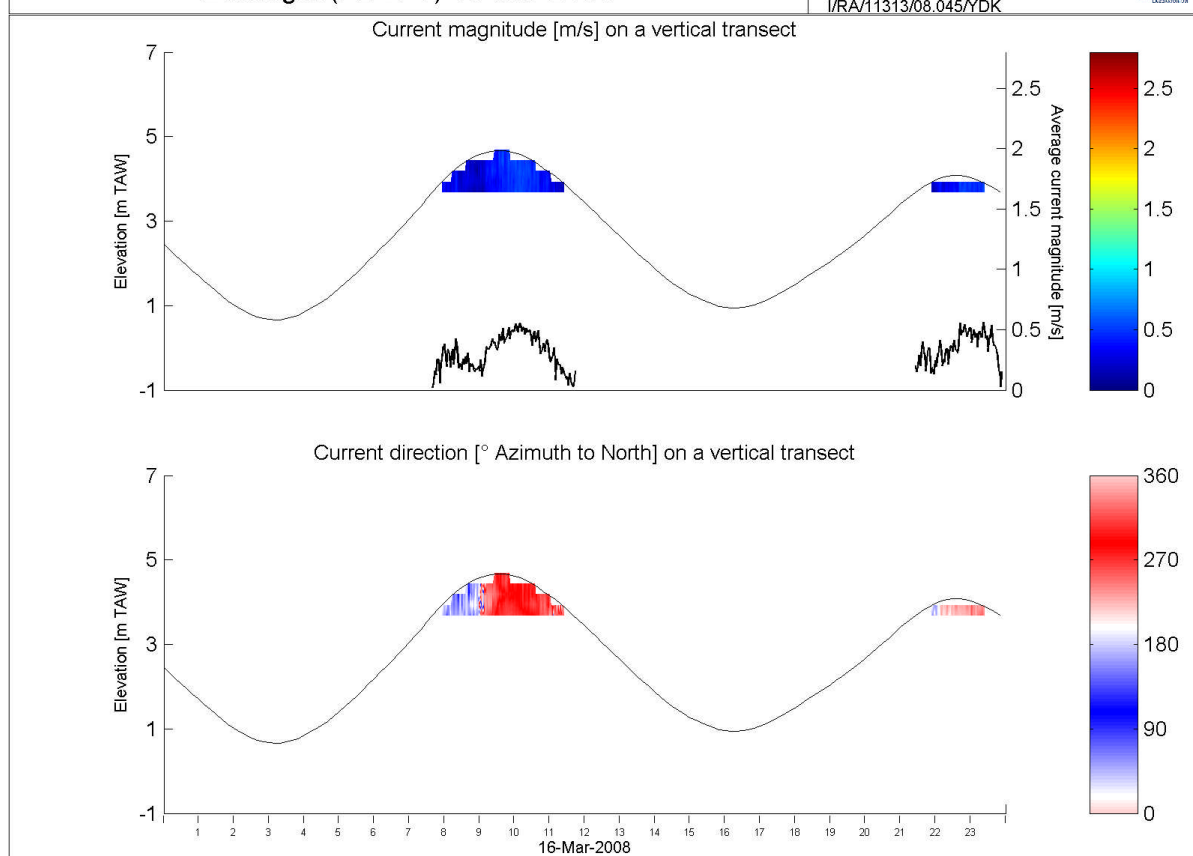
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 15-Mar-2008

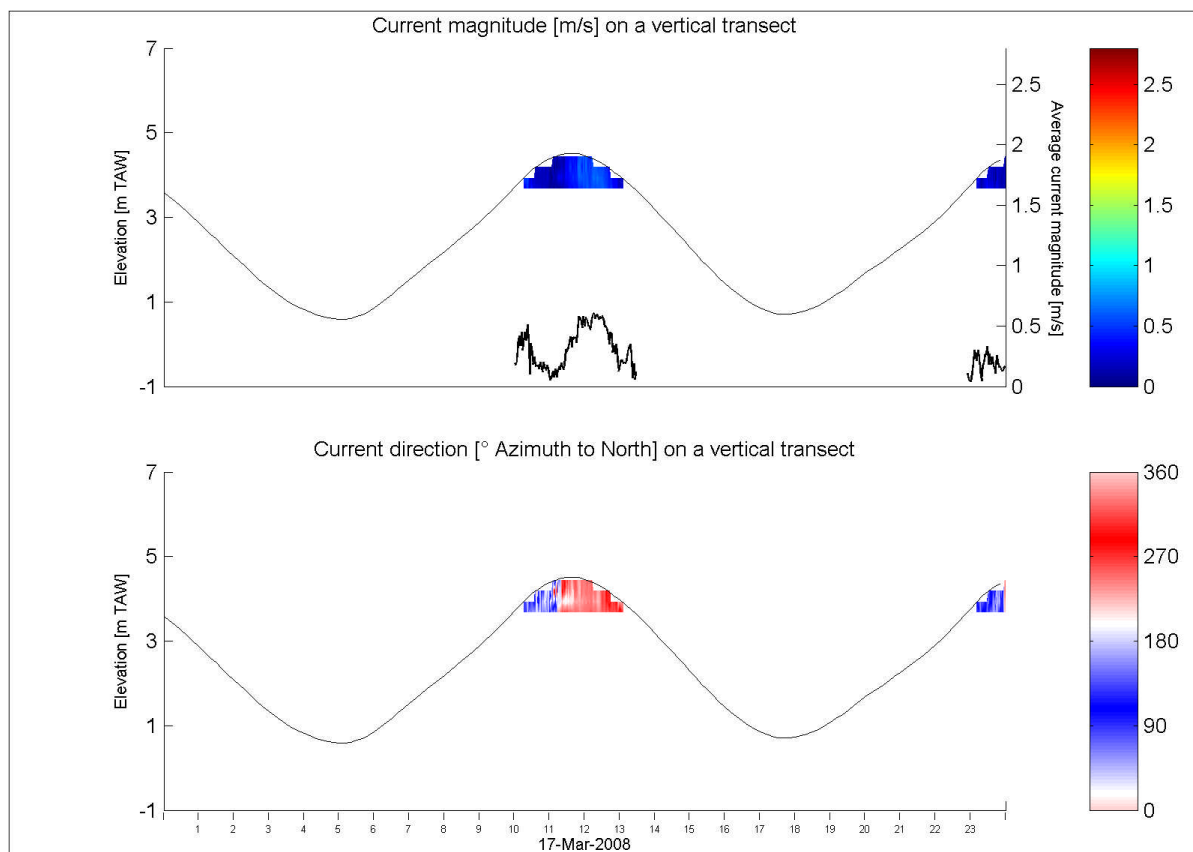
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 16-Mar-2008

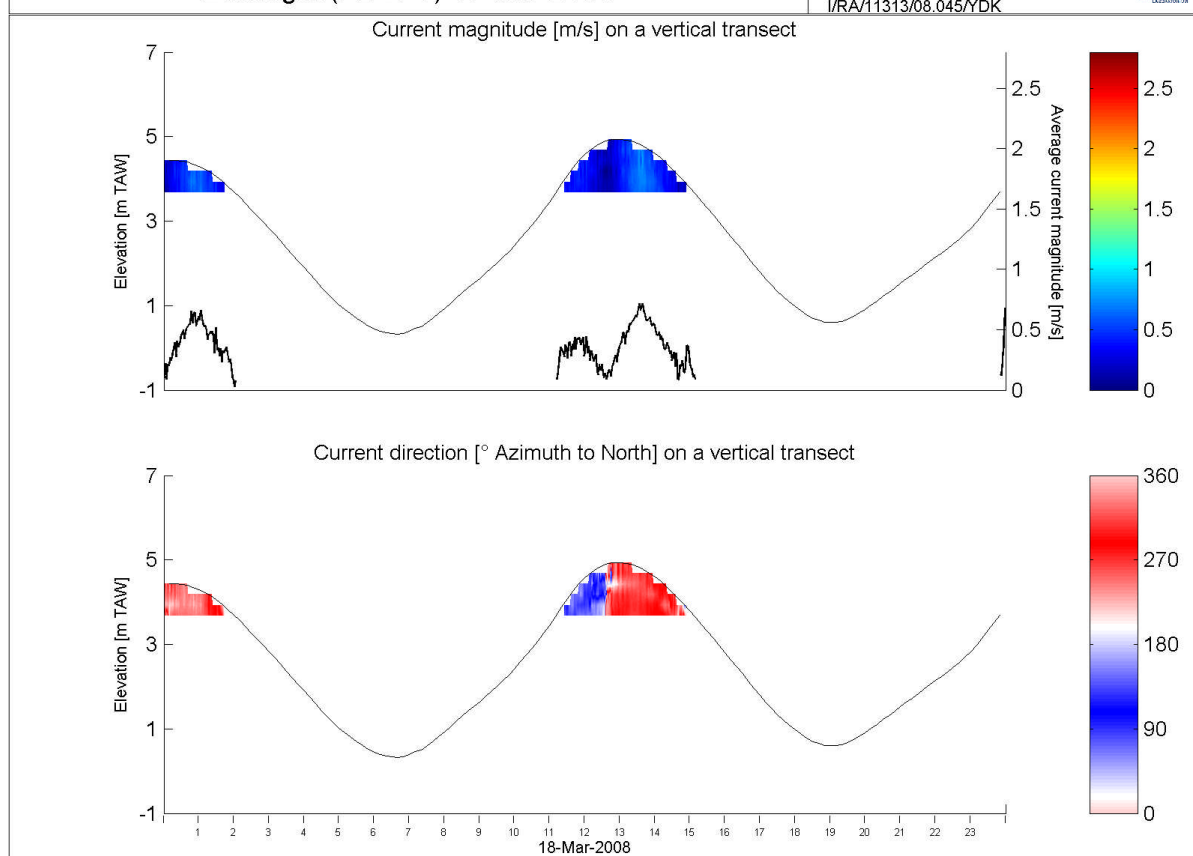
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 17-Mar-2008

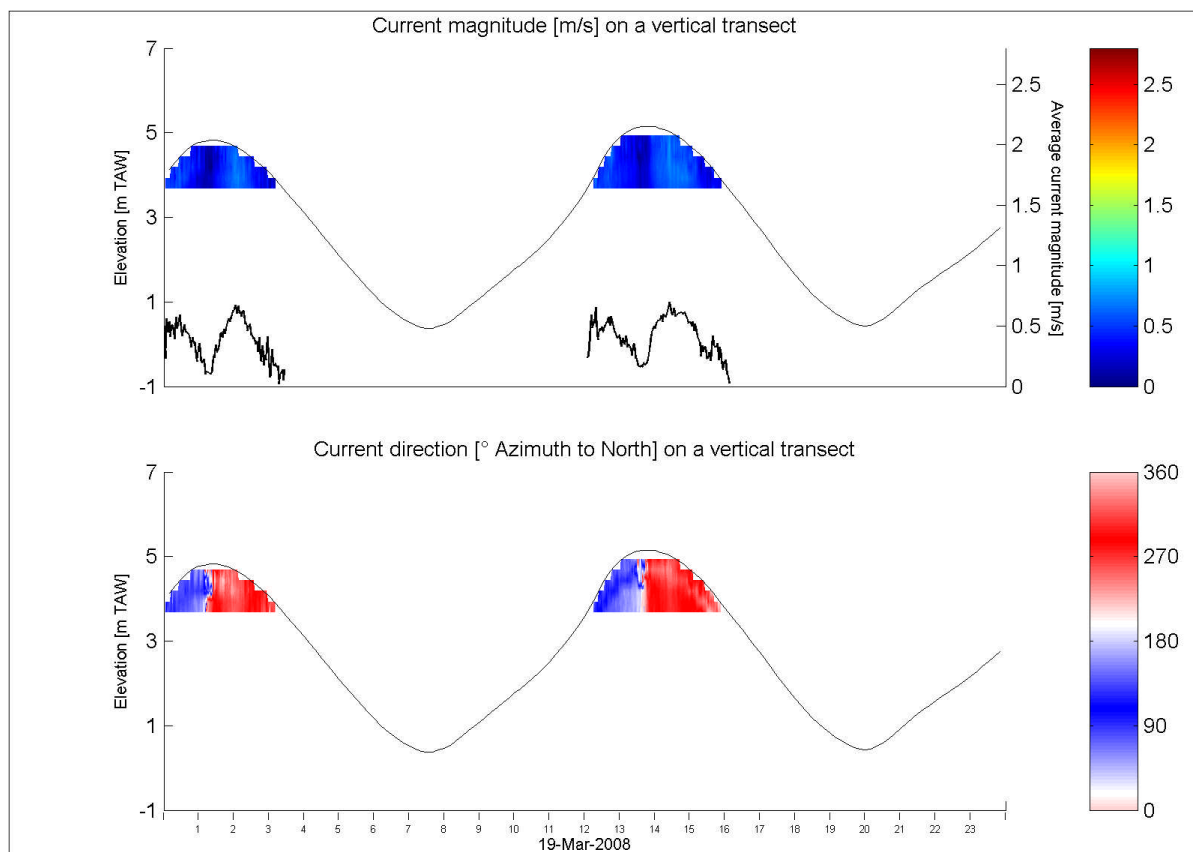
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 18-Mar-2008

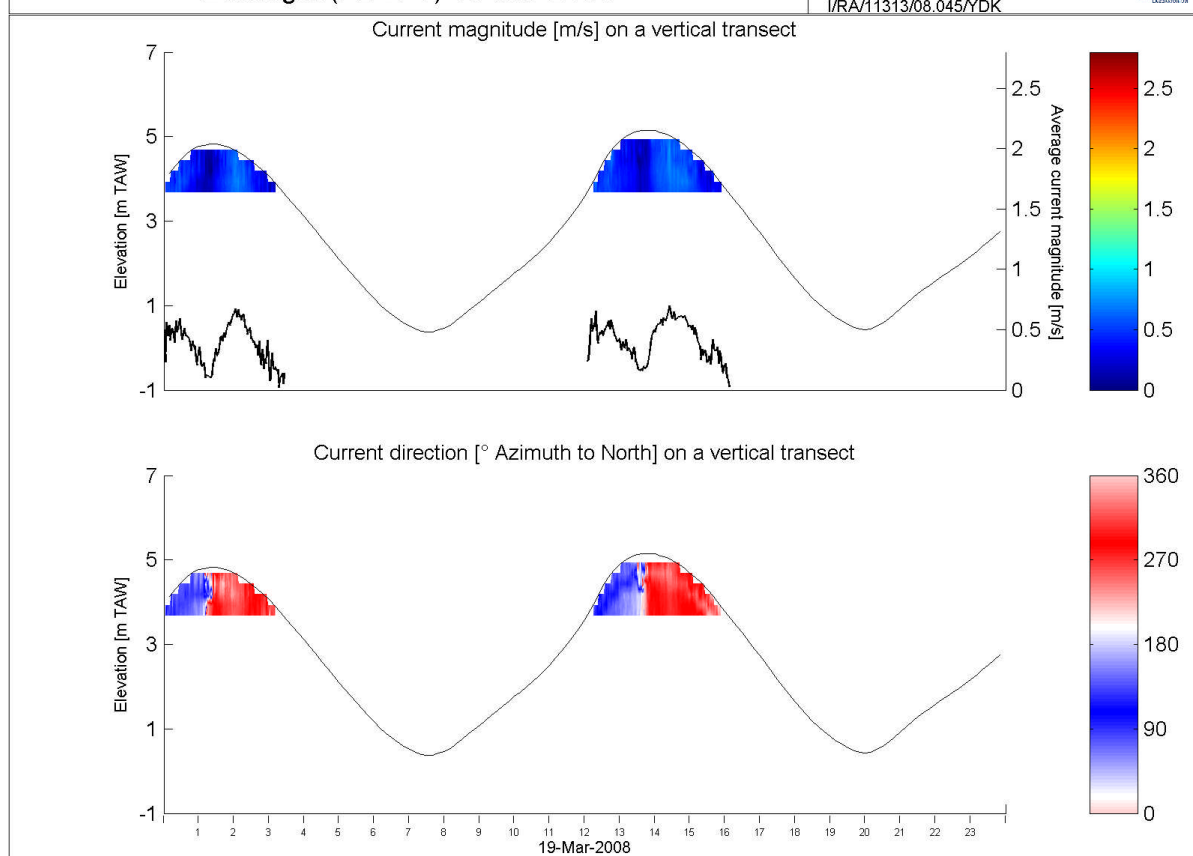
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 19-Mar-2008

Processed by:  
I/RA/11313/08.045/YDK

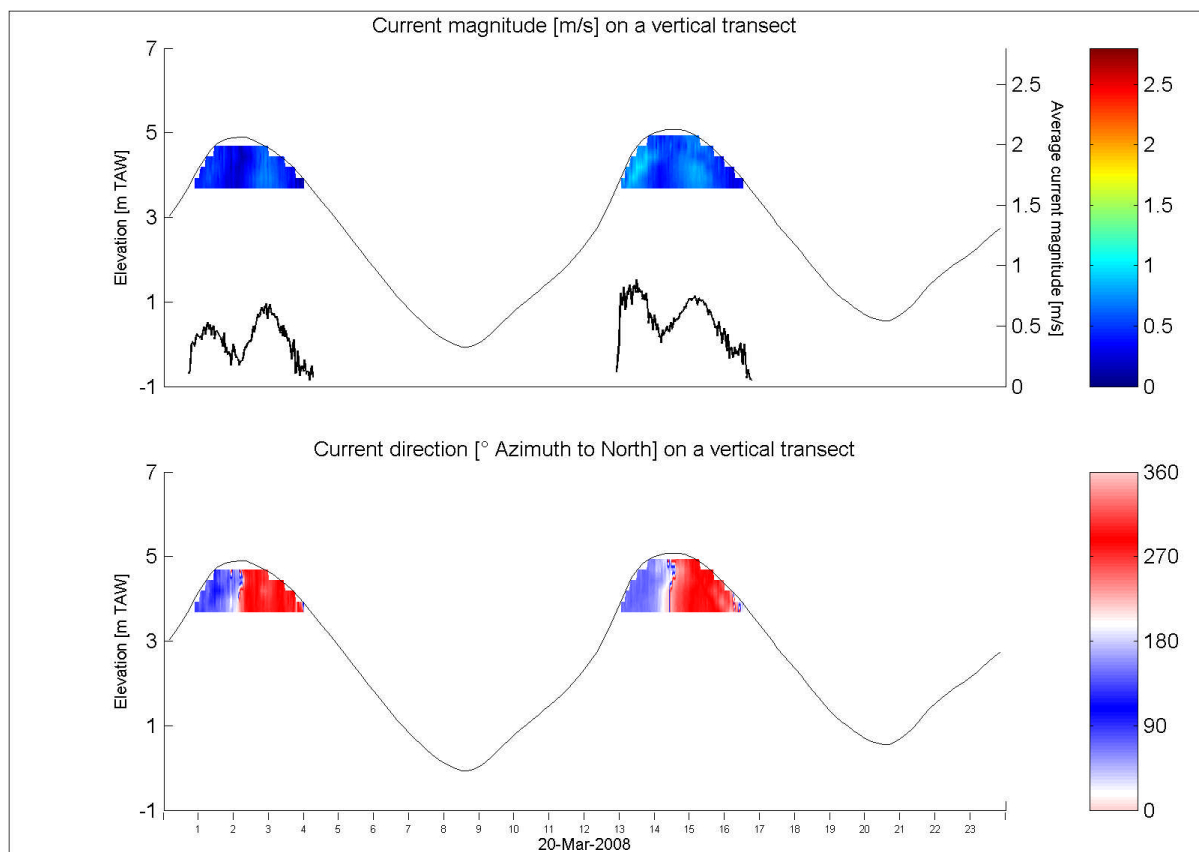


Zuidergat (ADCP1) 19-Mar-2008

Processed by:  
I/RA/11313/08.045/YDK

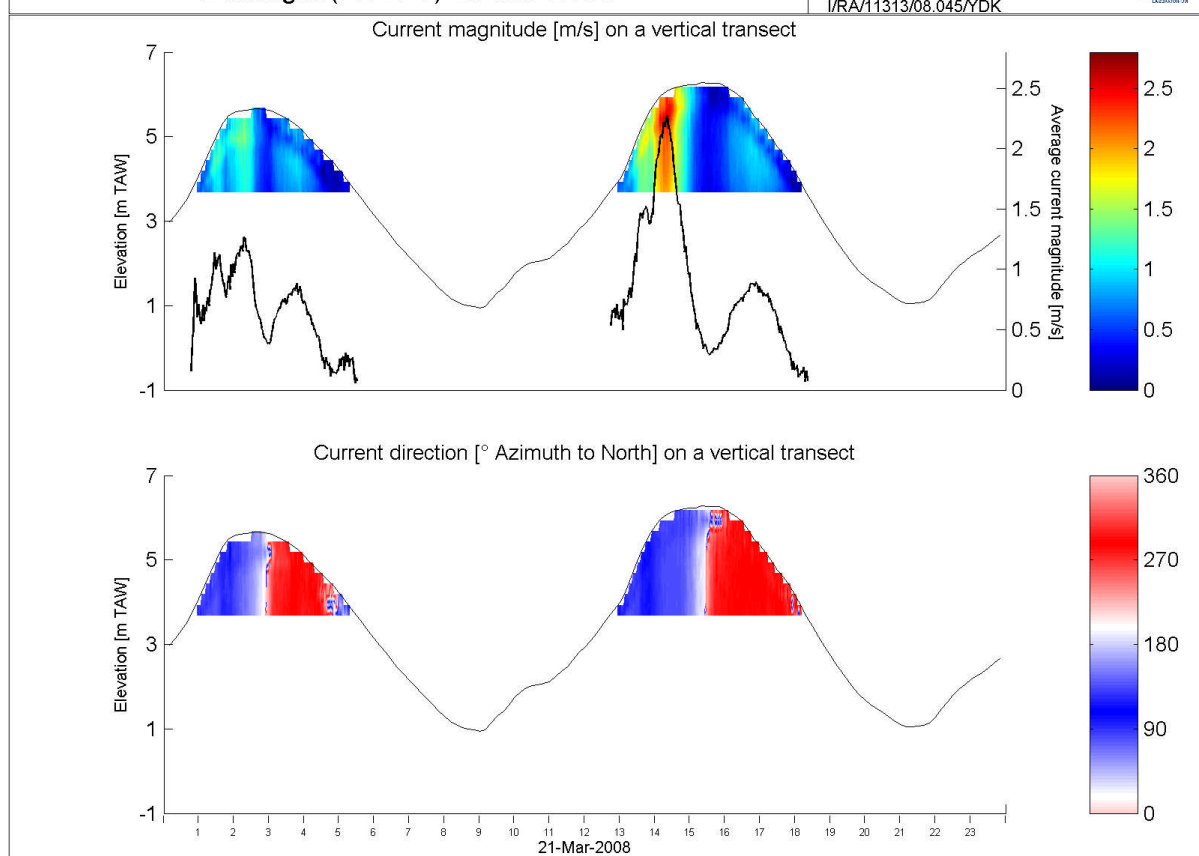






Zuidergat (ADCP1) 20-Mar-2008

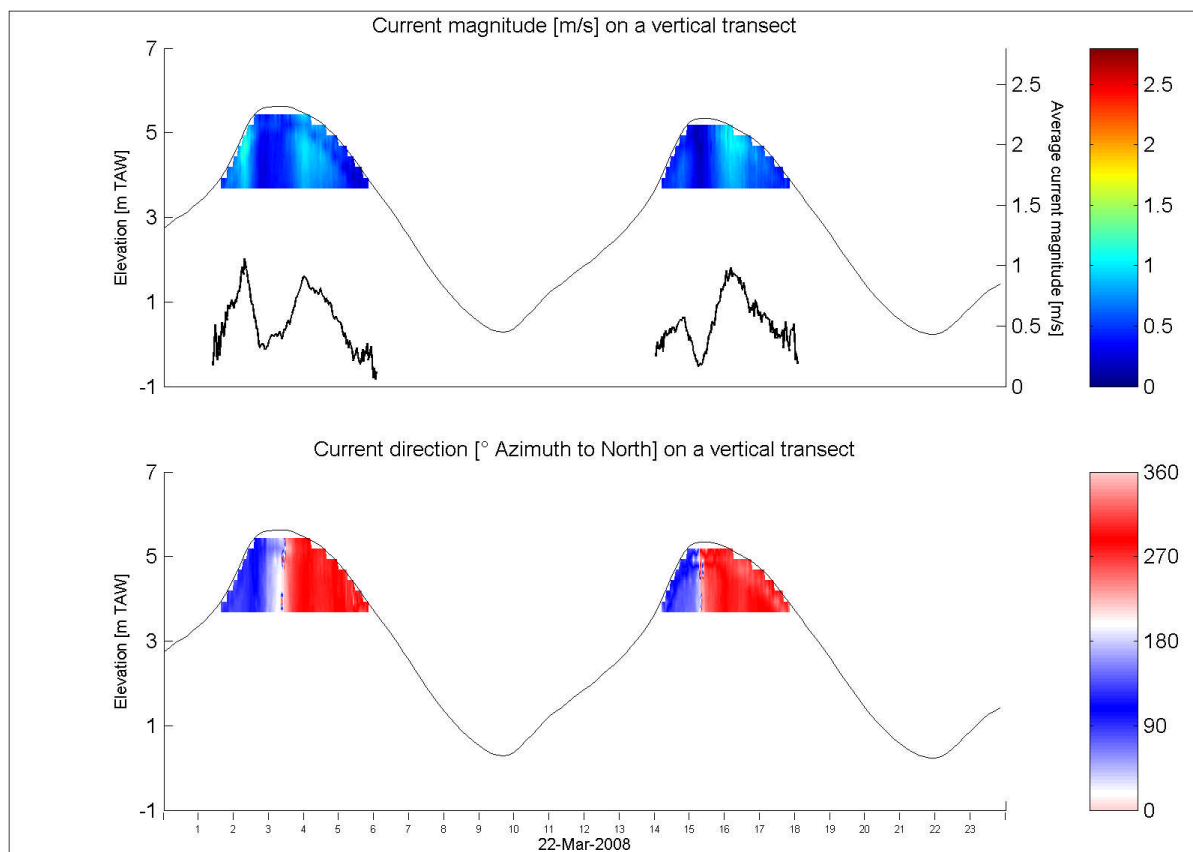
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 21-Mar-2008

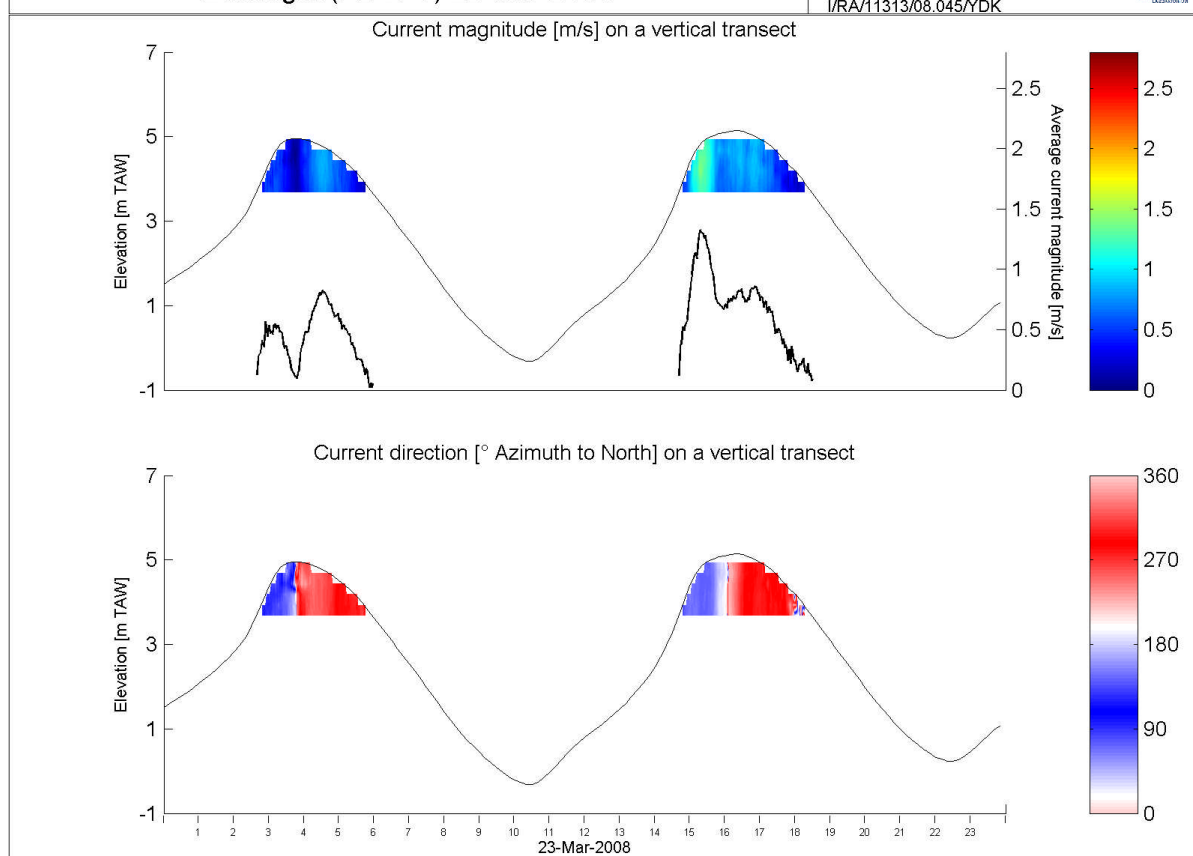
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 22-Mar-2008

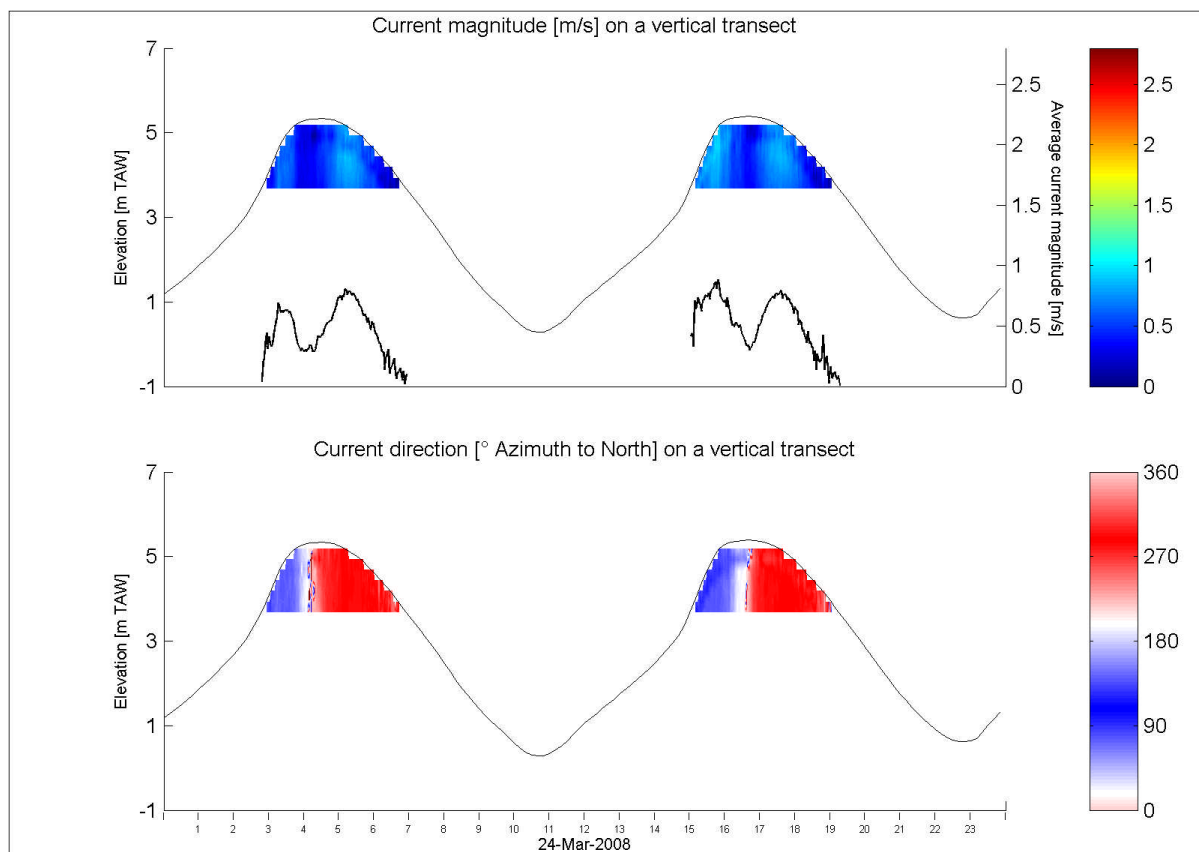
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 23-Mar-2008

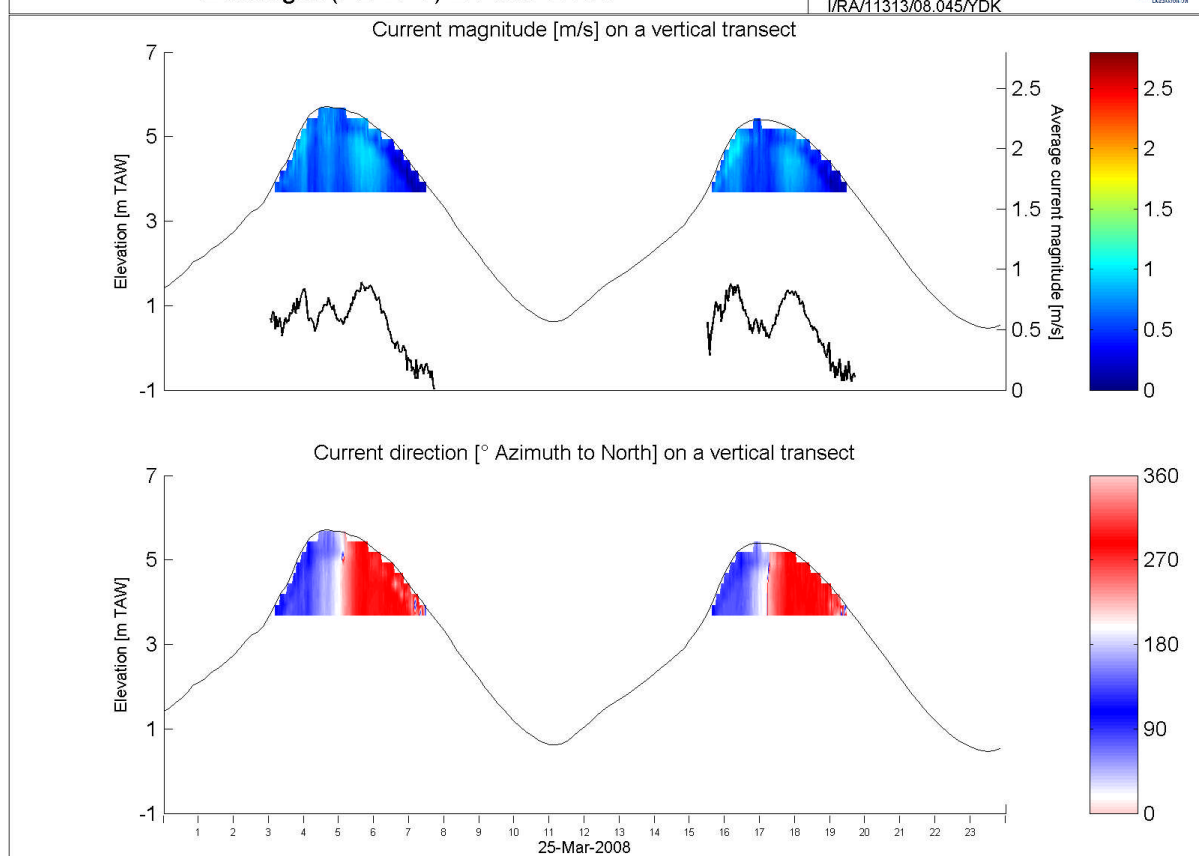
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 24-Mar-2008

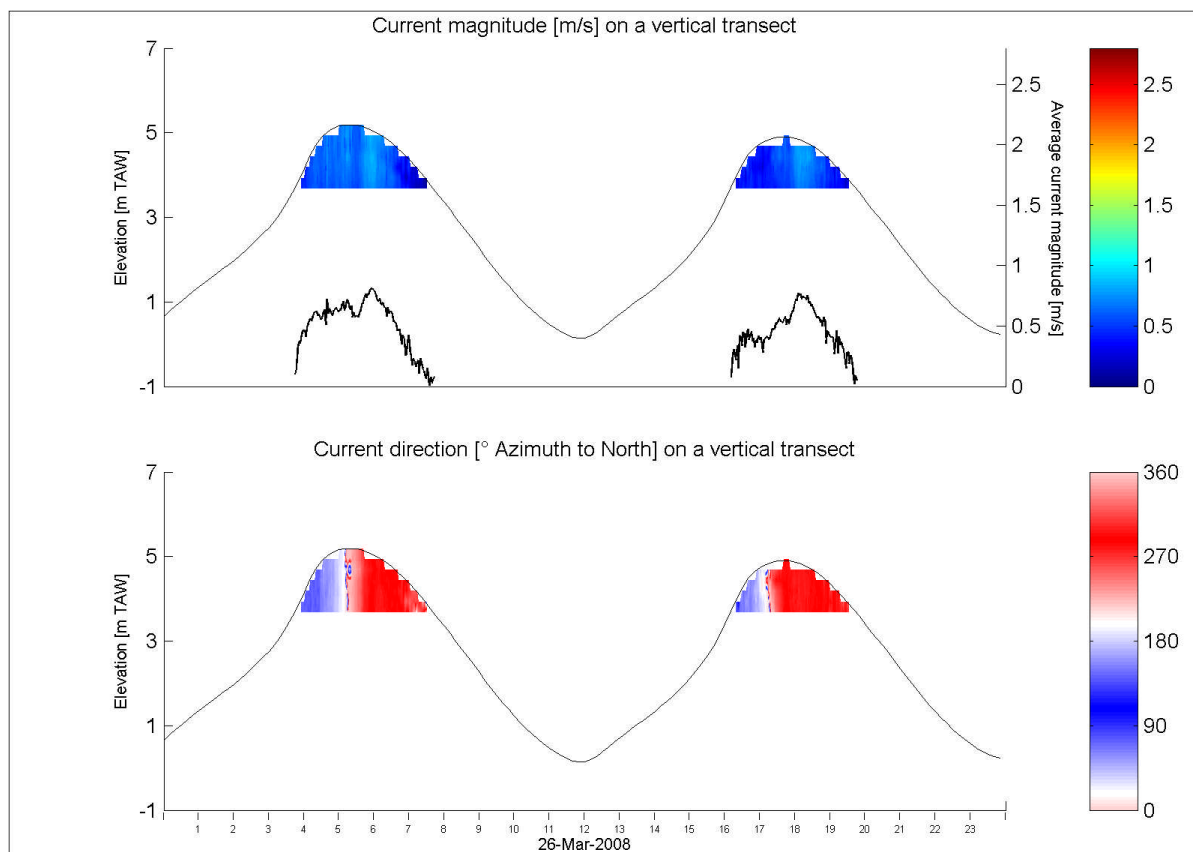
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 25-Mar-2008

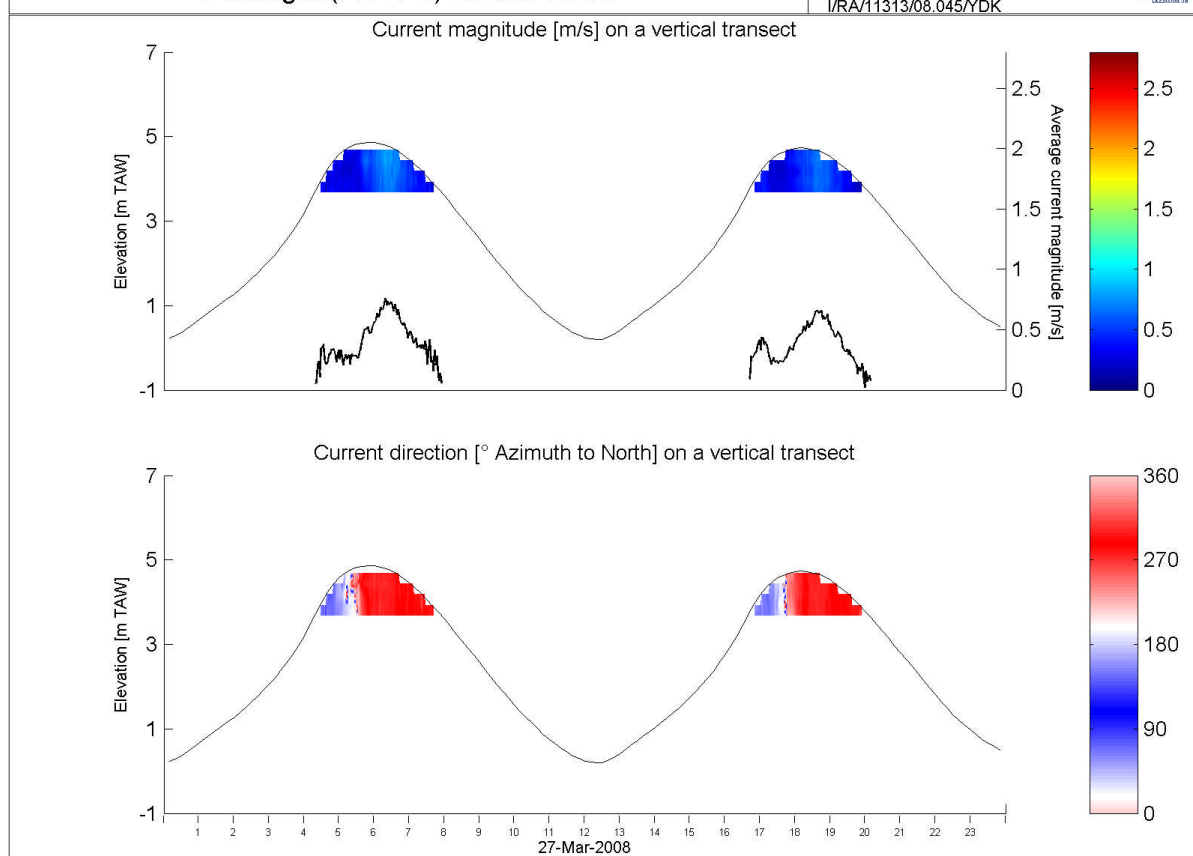
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 26-Mar-2008

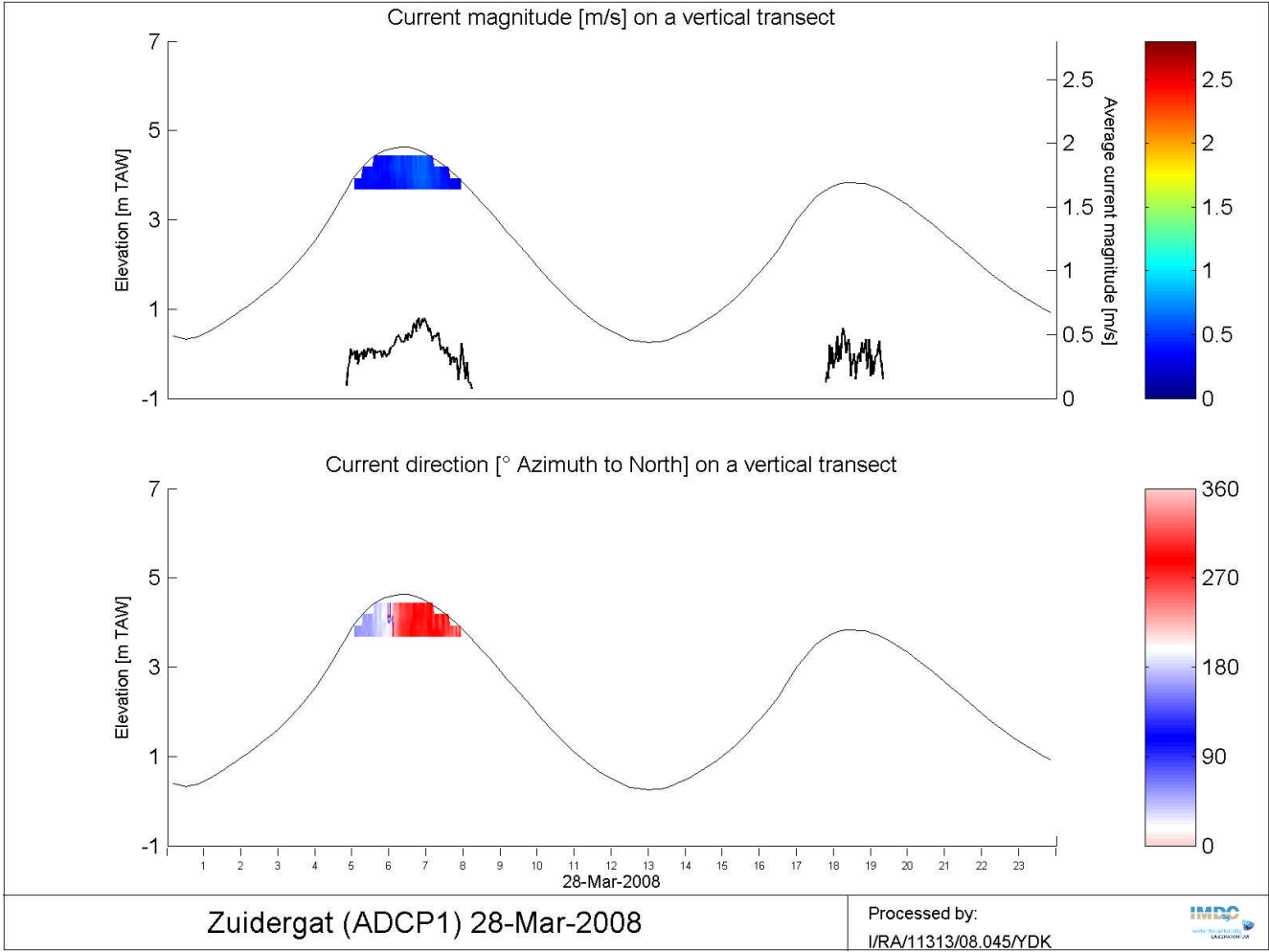
Processed by:  
I/RA/11313/08.045/YDK

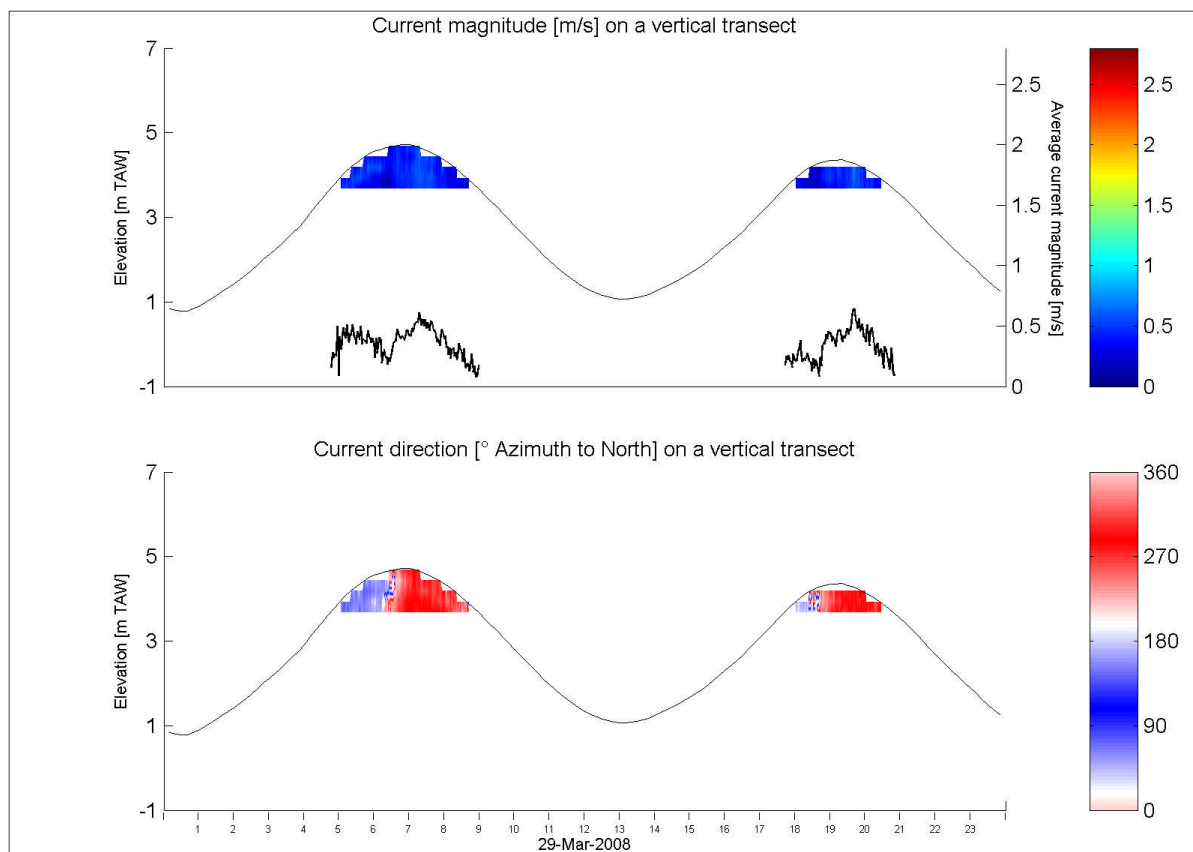


Zuidergat (ADCP1) 27-Mar-2008

Processed by:  
I/RA/11313/08.045/YDK

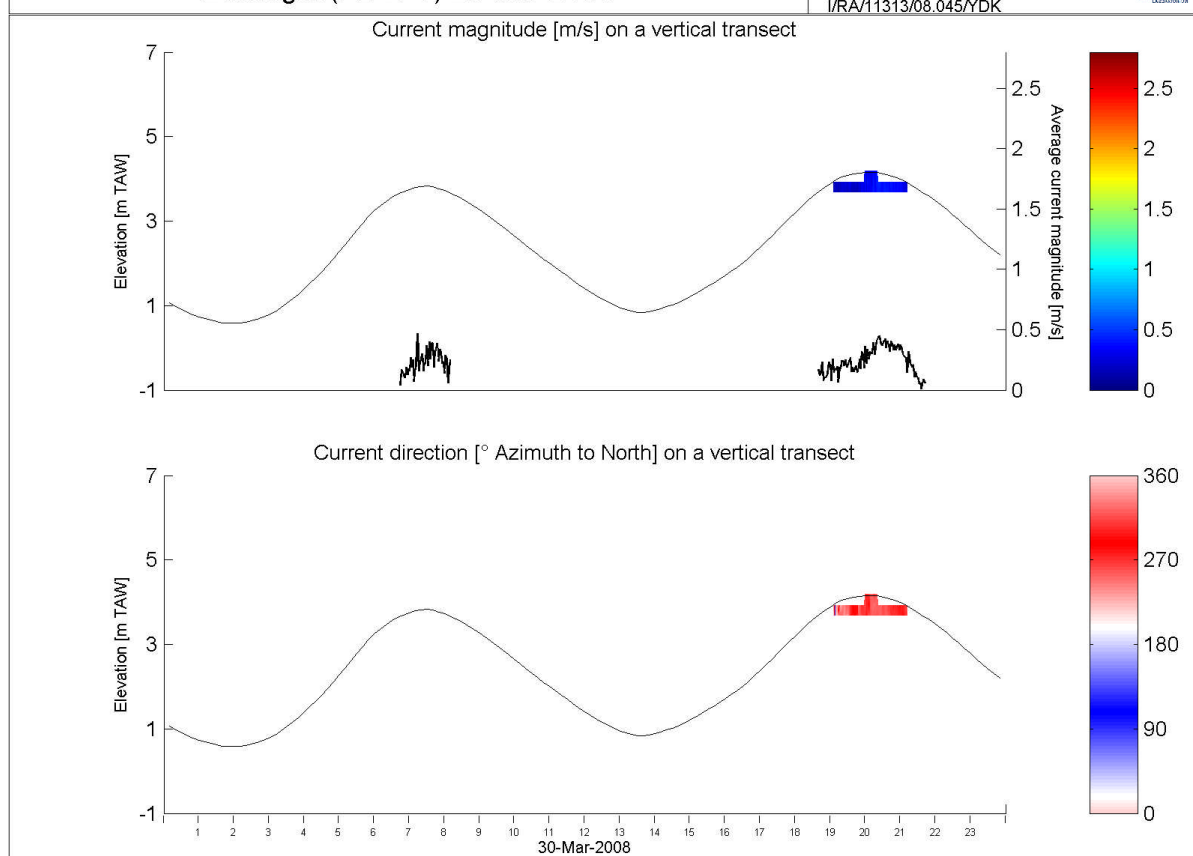






Zuidergat (ADCP1) 29-Mar-2008

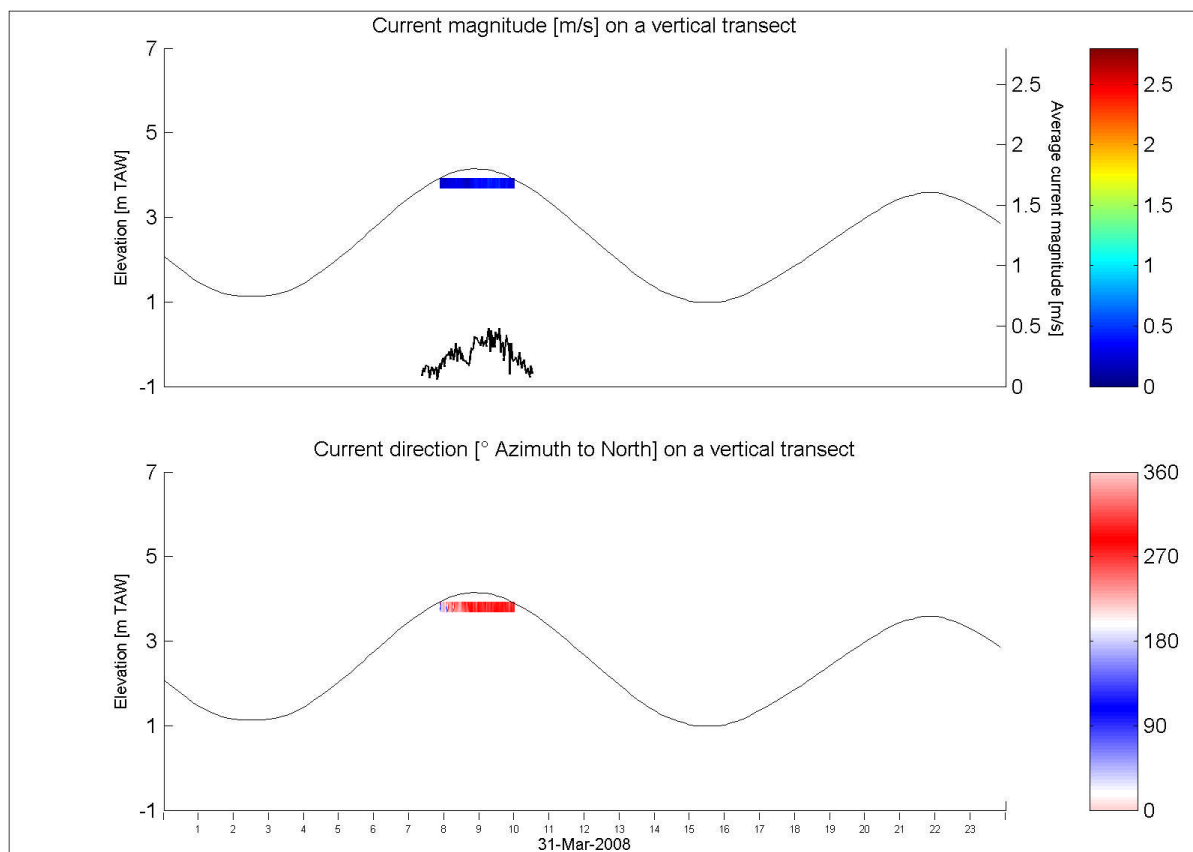
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 30-Mar-2008

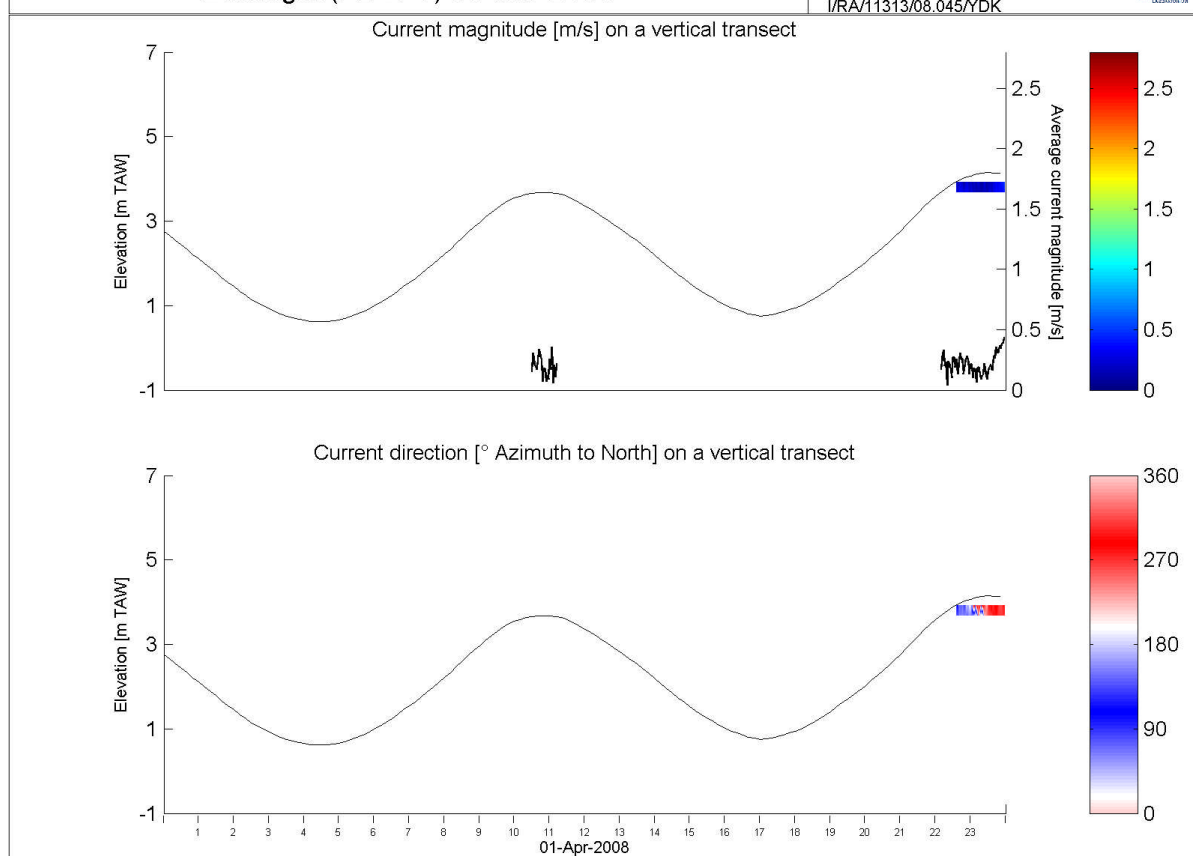
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 31-Mar-2008

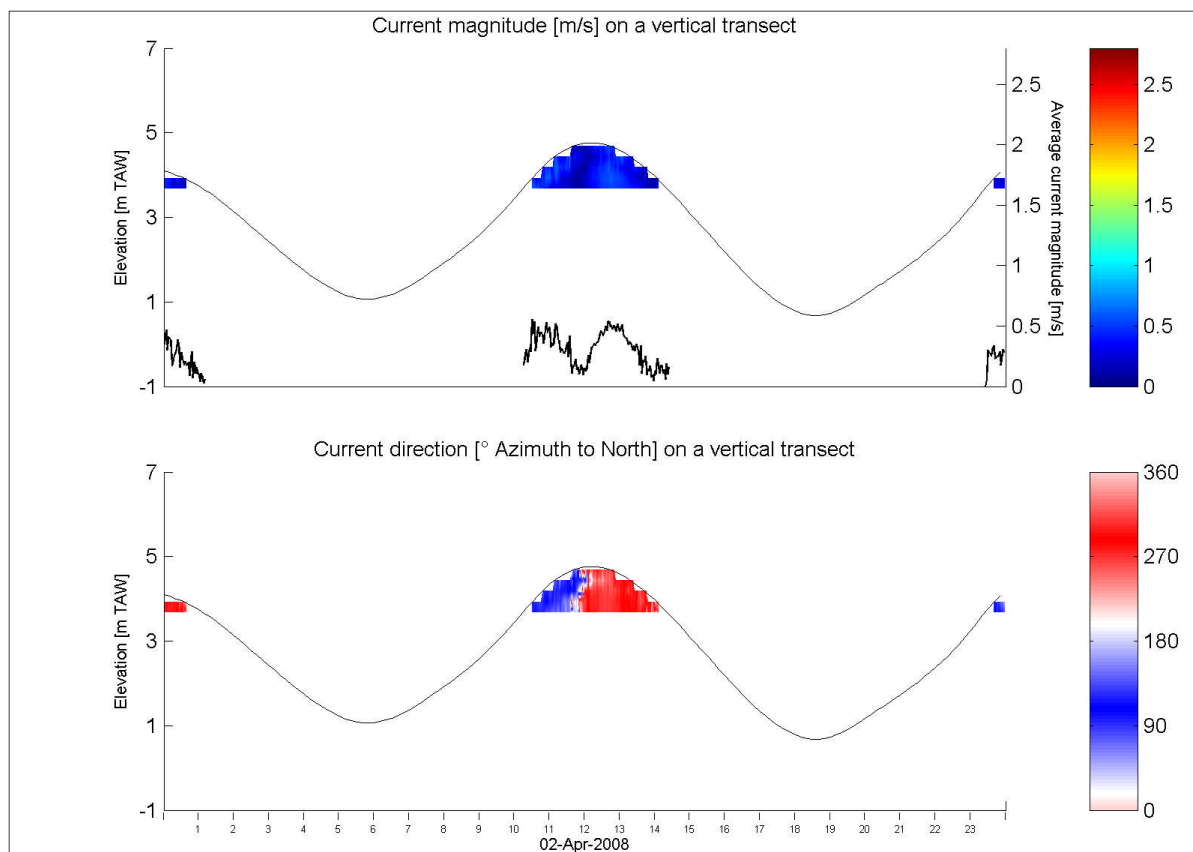
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 01-Apr-2008

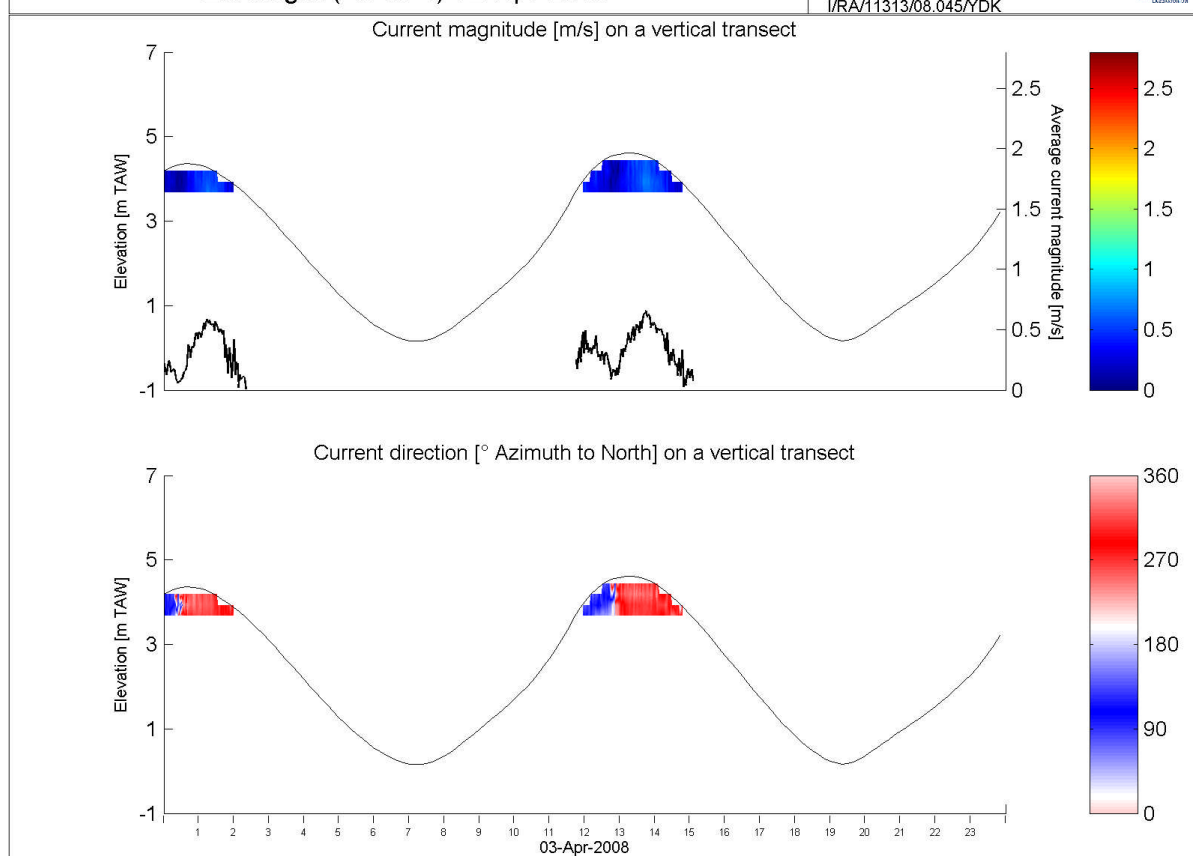
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 02-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK

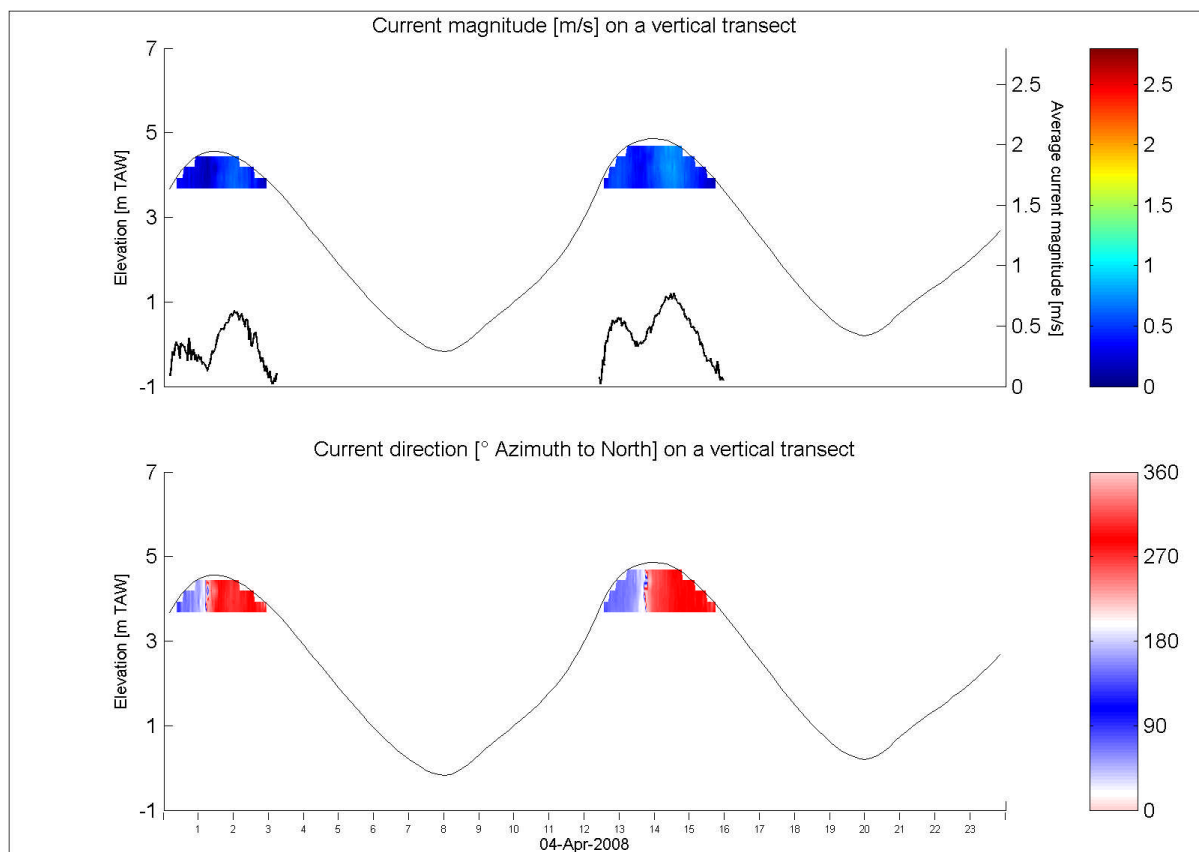


Zuidergat (ADCP1) 03-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK

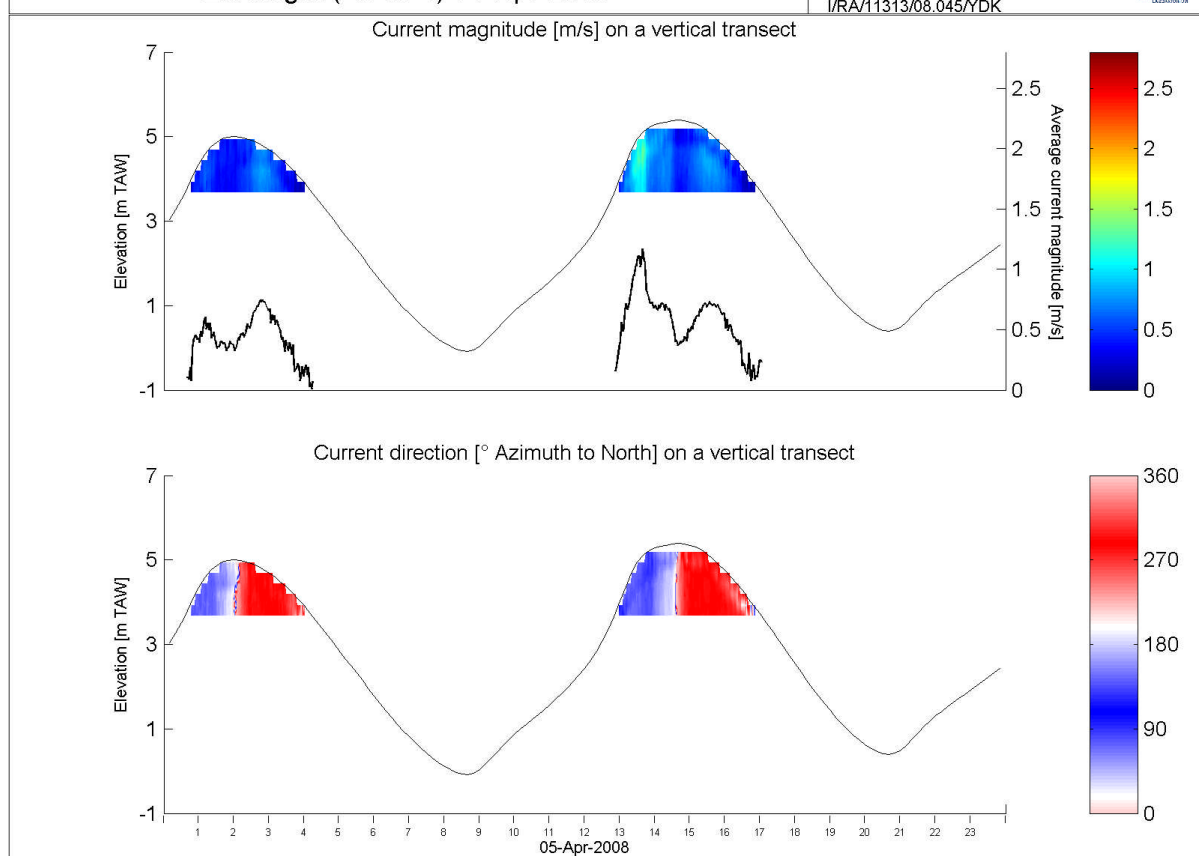






Zuidergat (ADCP1) 04-Apr-2008

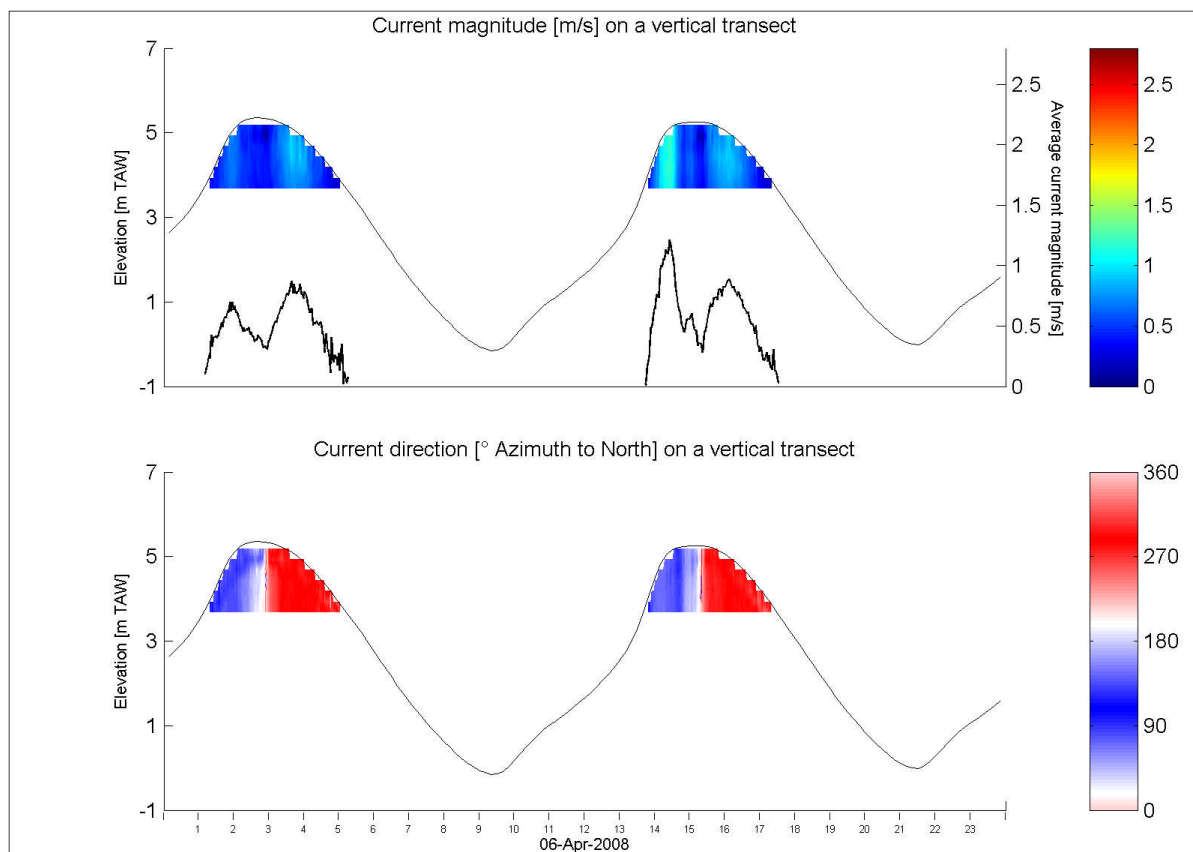
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 05-Apr-2008

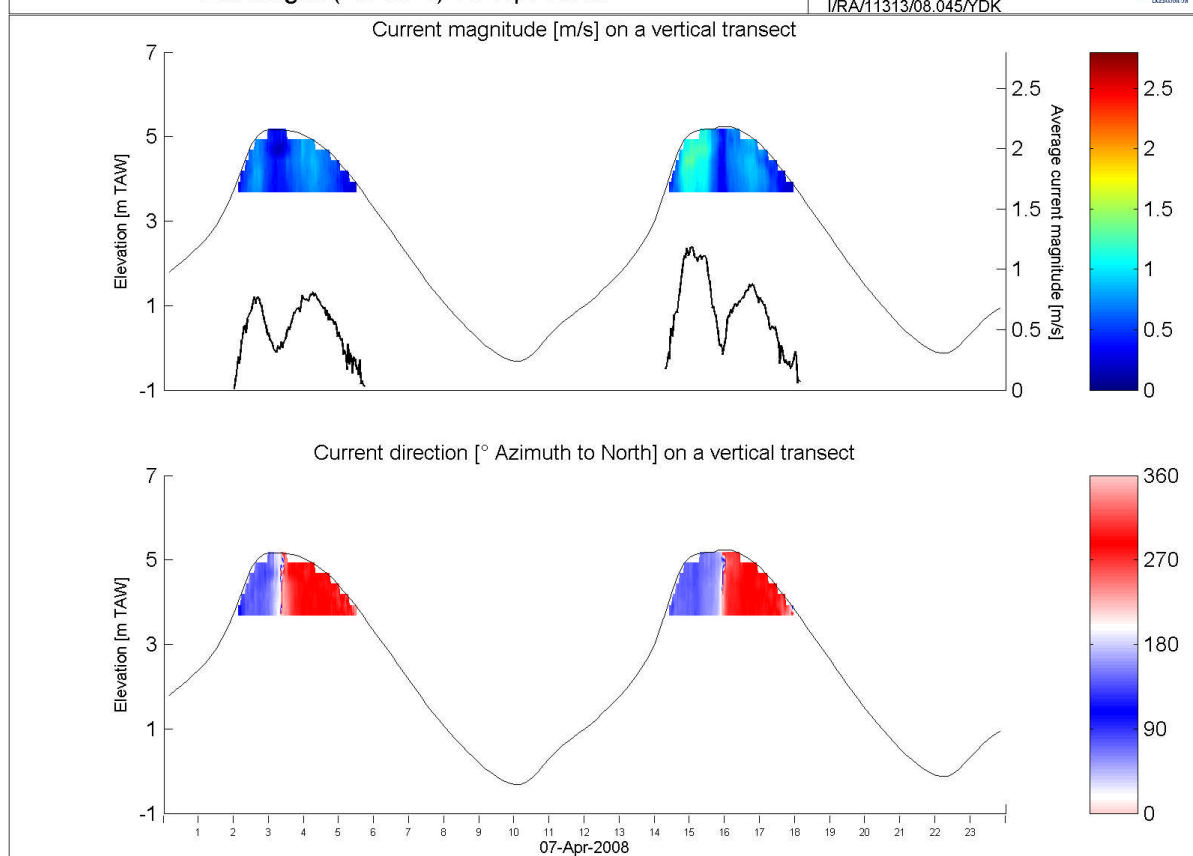
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 06-Apr-2008

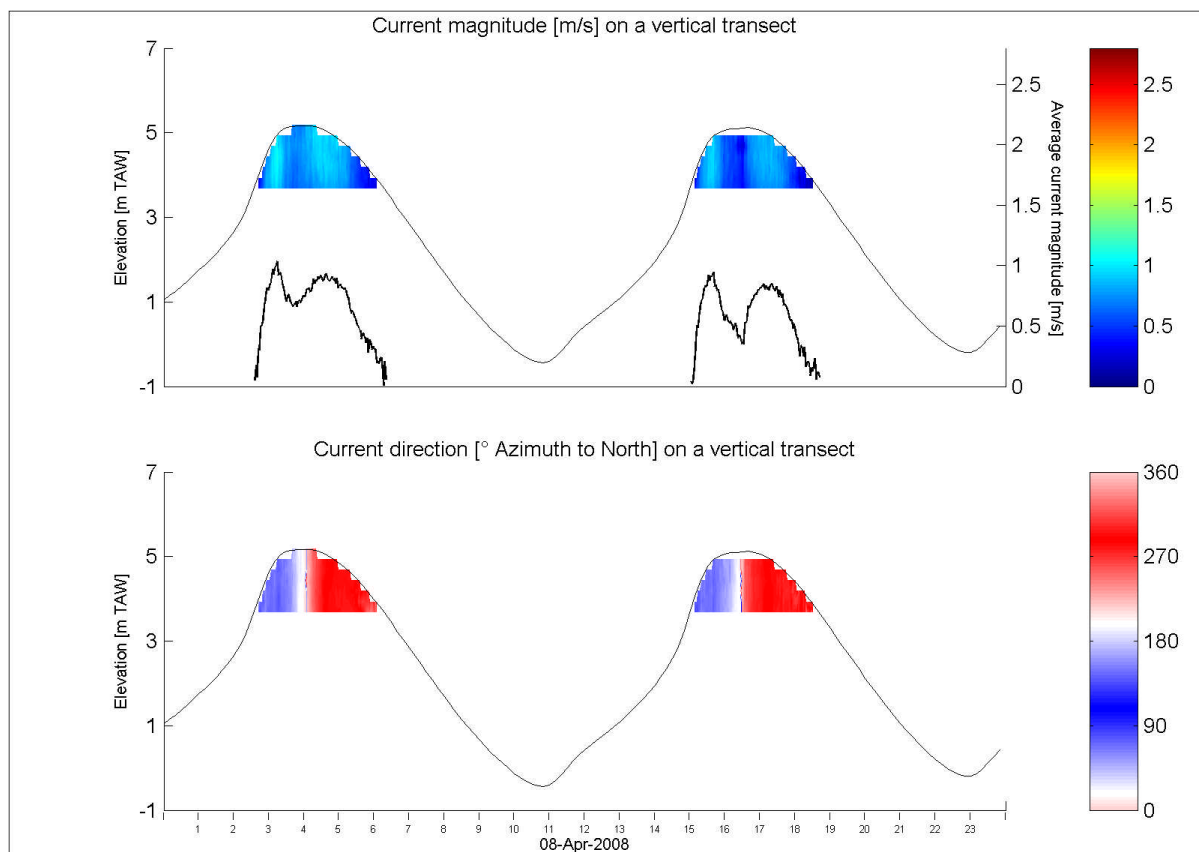
Processed by:  
I/RA/11313/08.045/YDK



Zuidergat (ADCP1) 07-Apr-2008

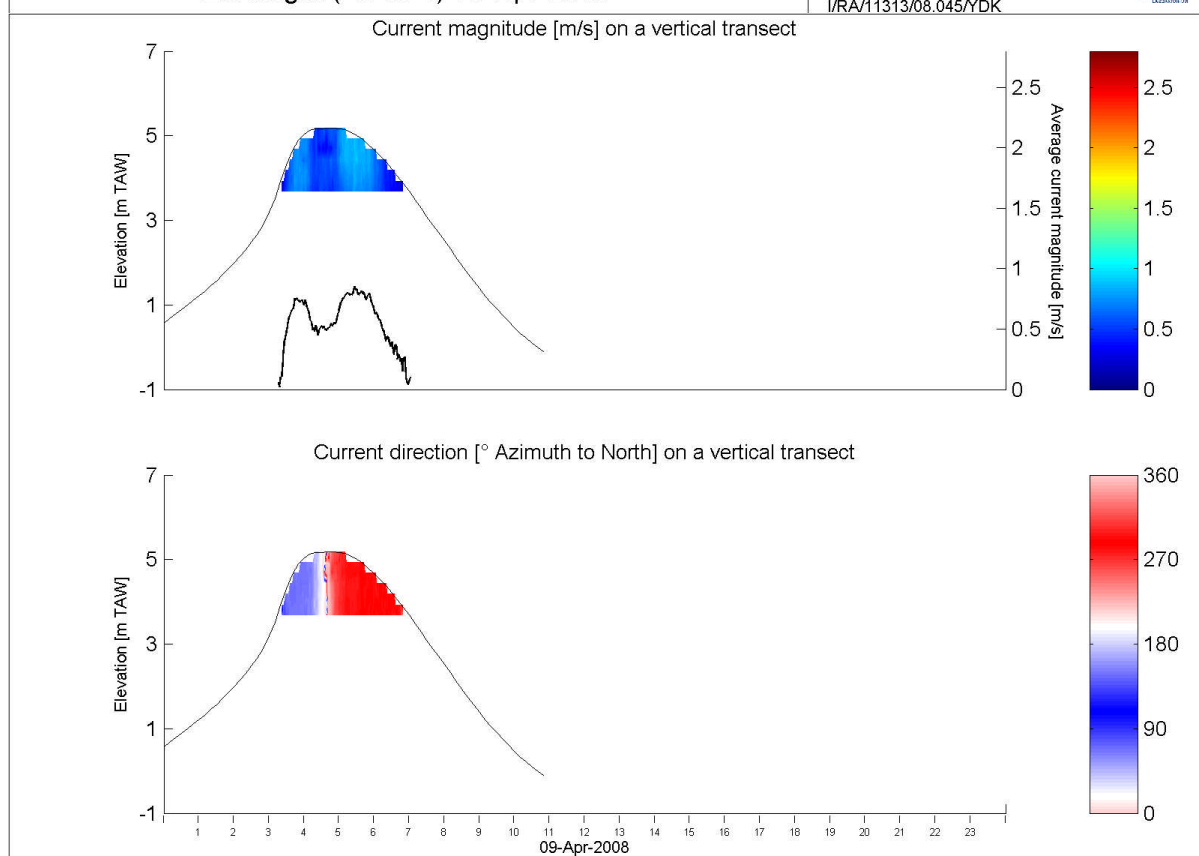
Processed by:  
I/RA/11313/08.045/YDK





Zuidergat (ADCP1) 08-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK

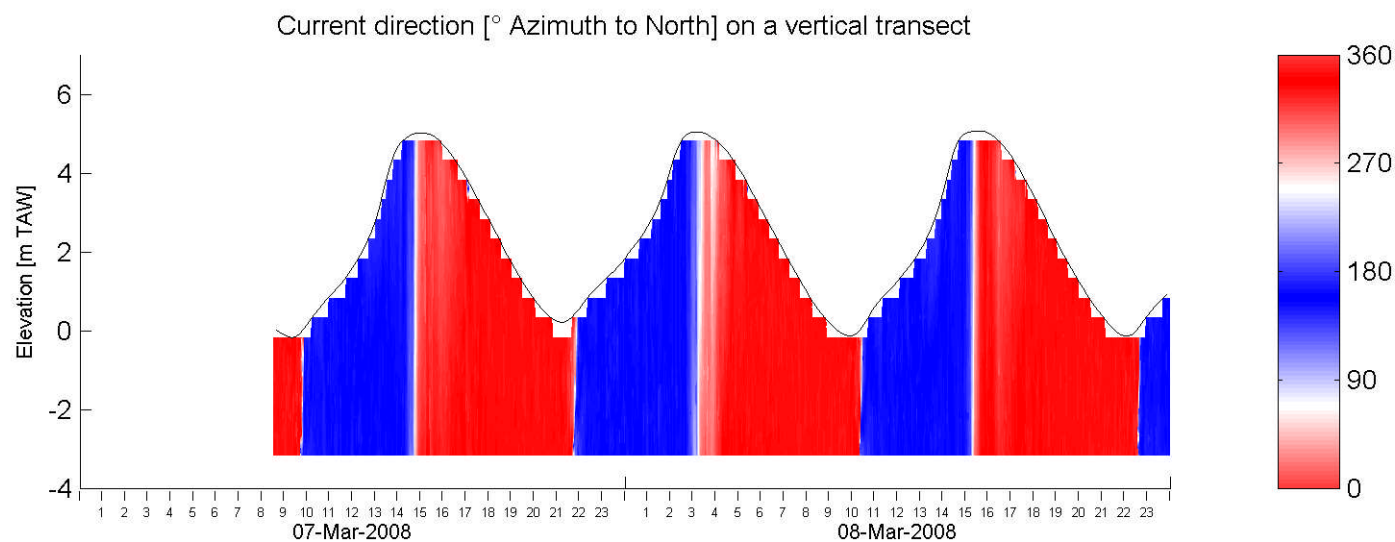
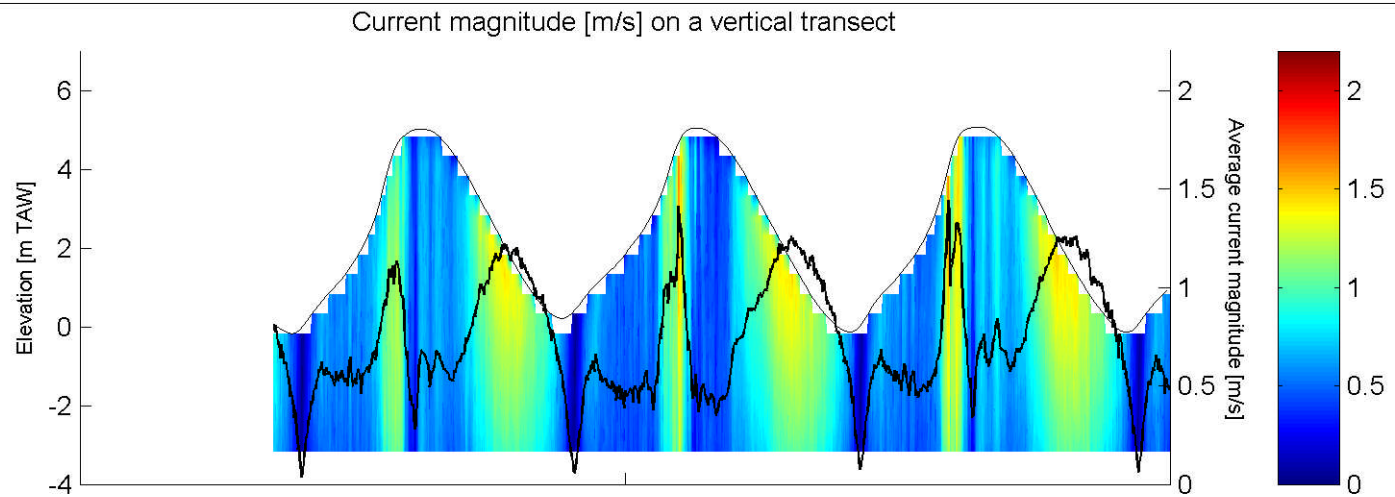


Zuidergat (ADCP1) 09-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK



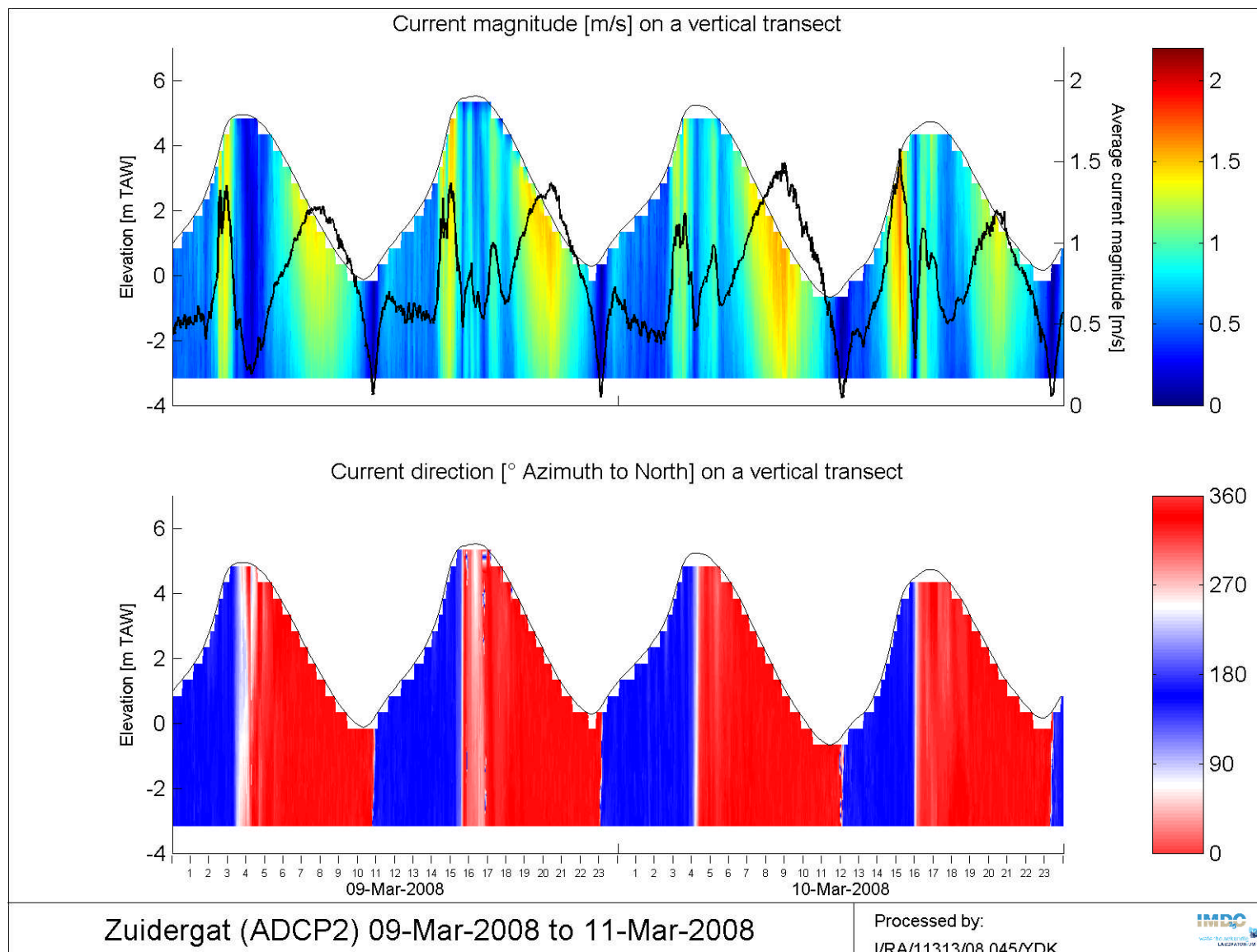
## **E.2 ADCP2**

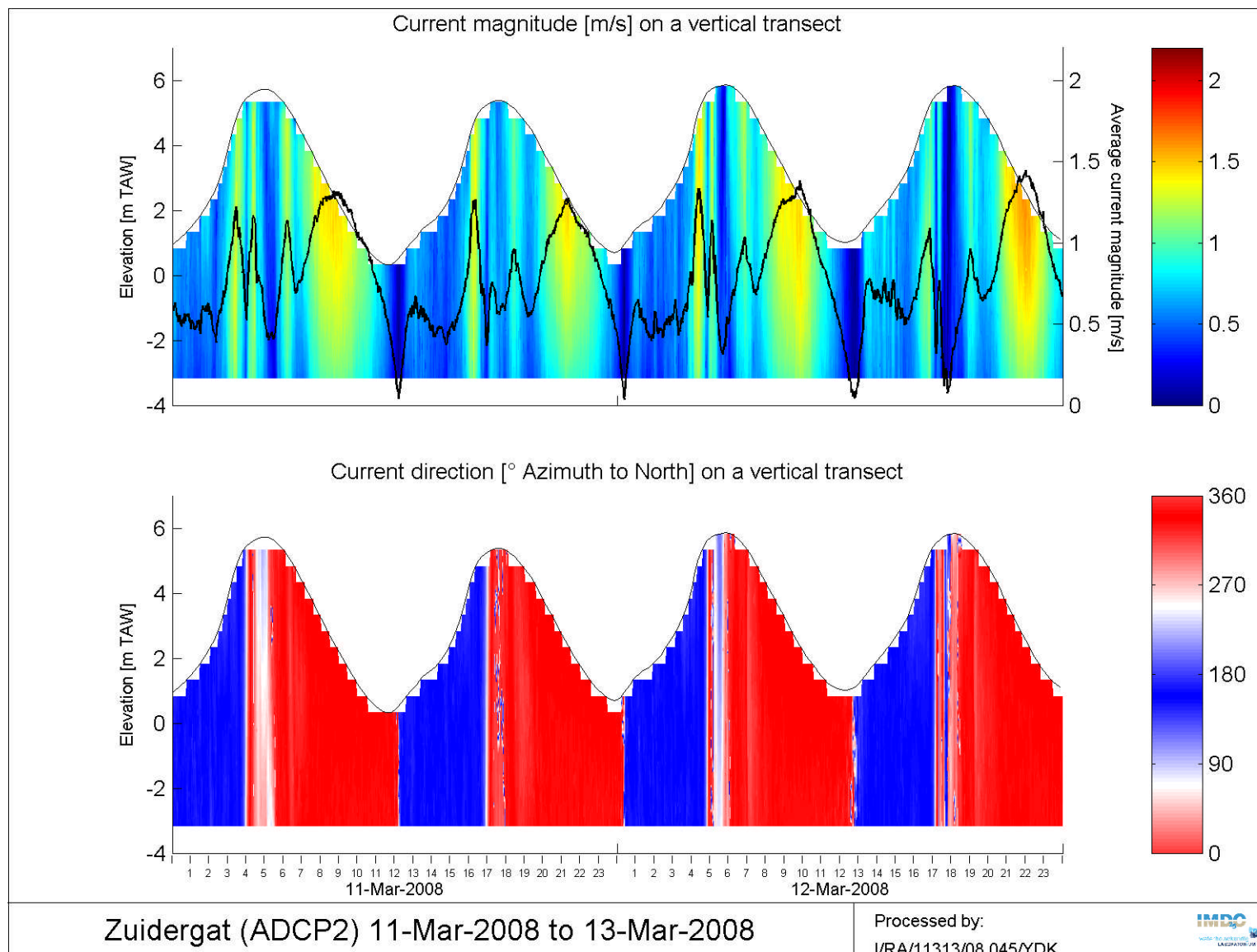


Zuidergat (ADCP2) 07-Mar-2008 to 09-Mar-2008

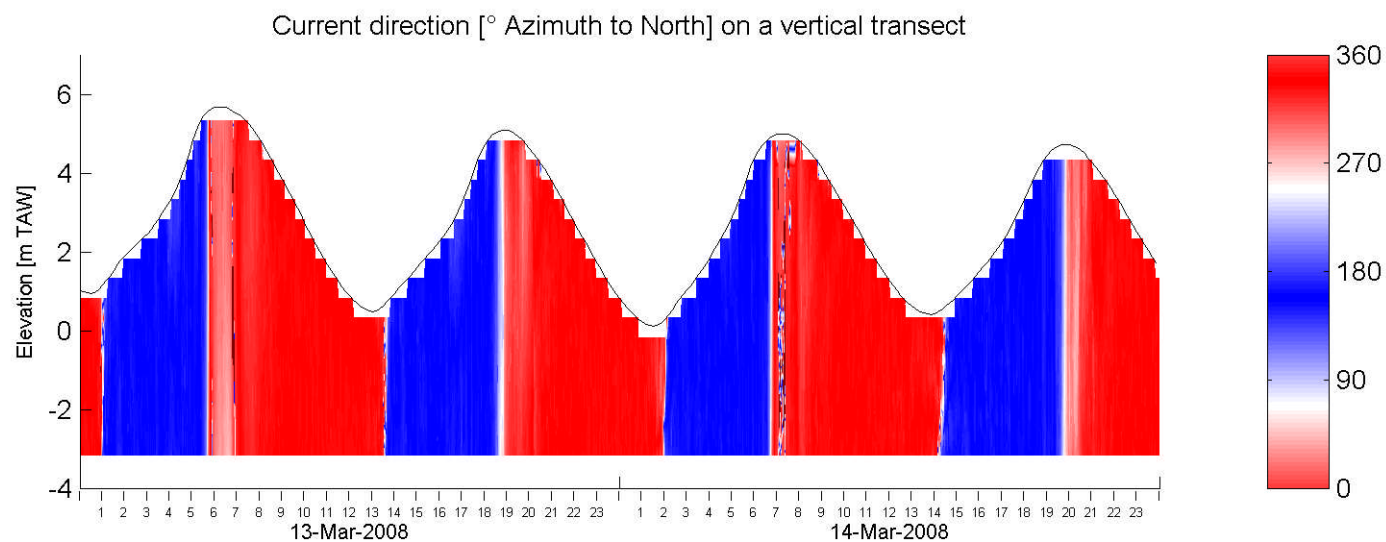
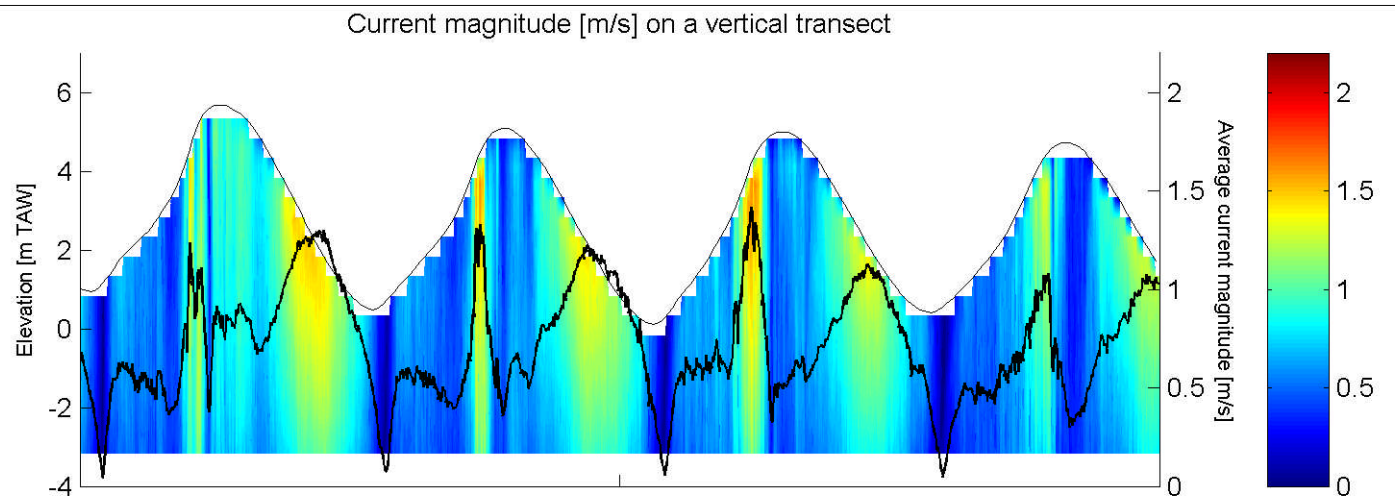
Processed by:  
I/RA/11313/08.045/YDK









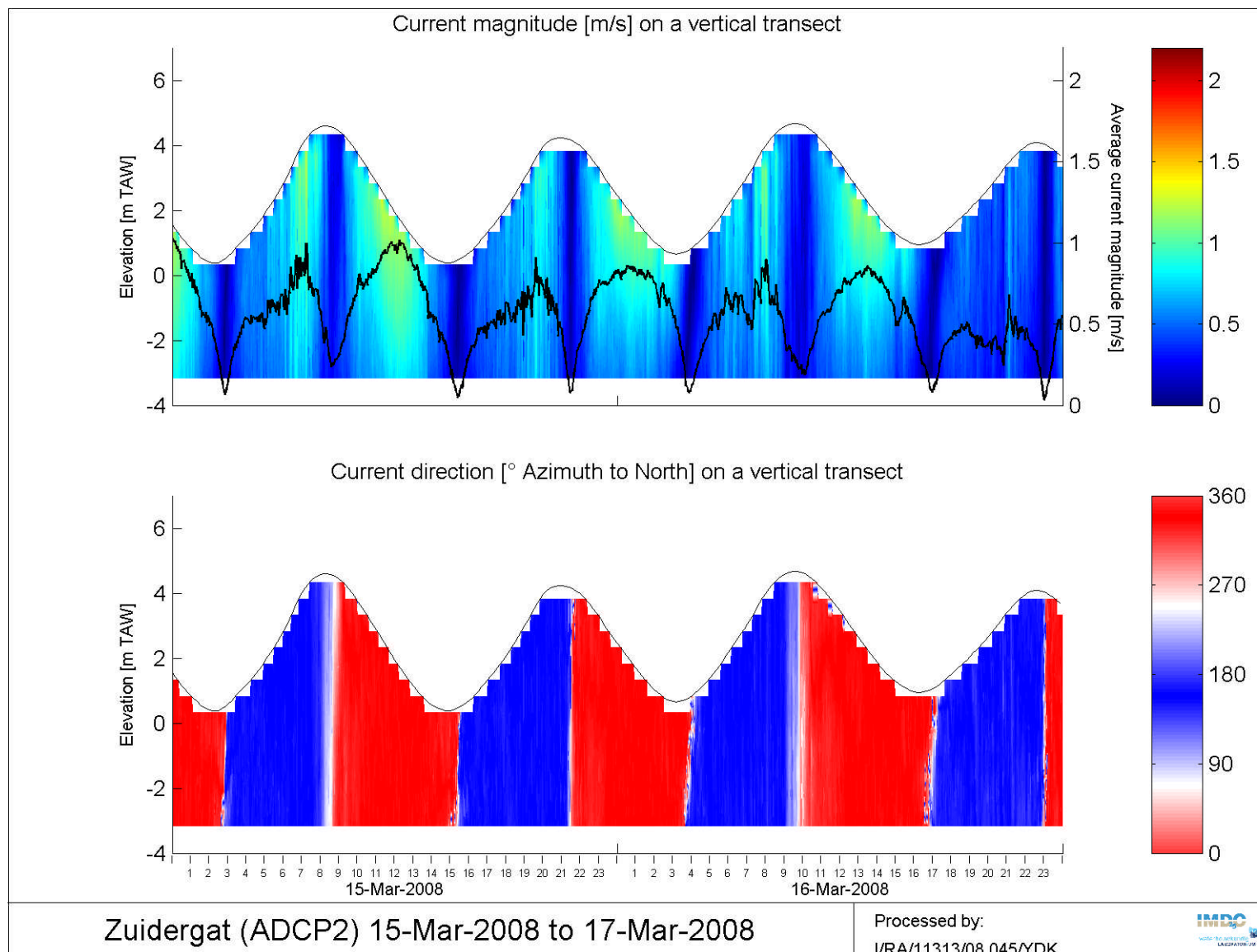


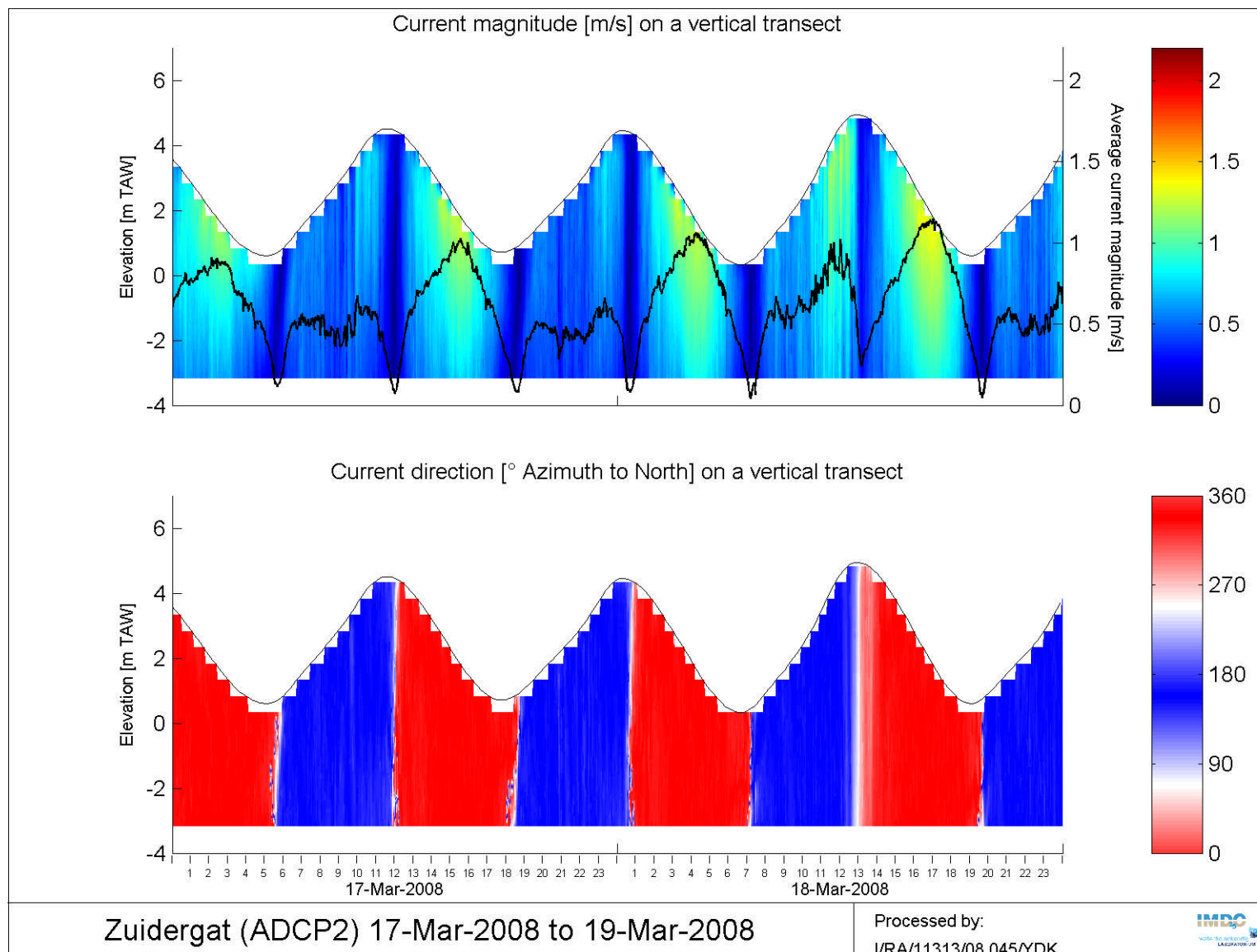
Zuidergat (ADCP2) 13-Mar-2008 to 15-Mar-2008

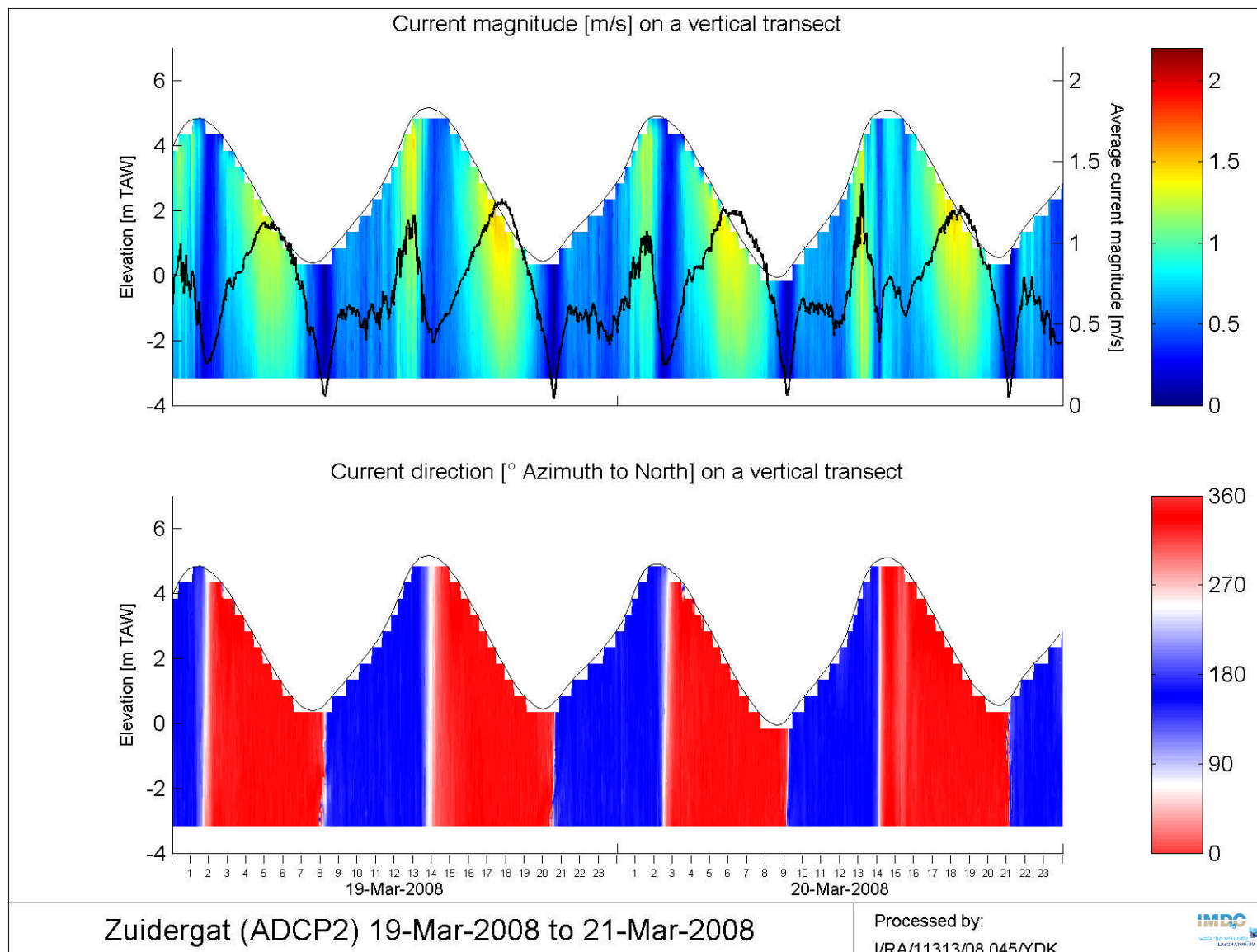
Processed by:  
I/RA/11313/08.045/YDK

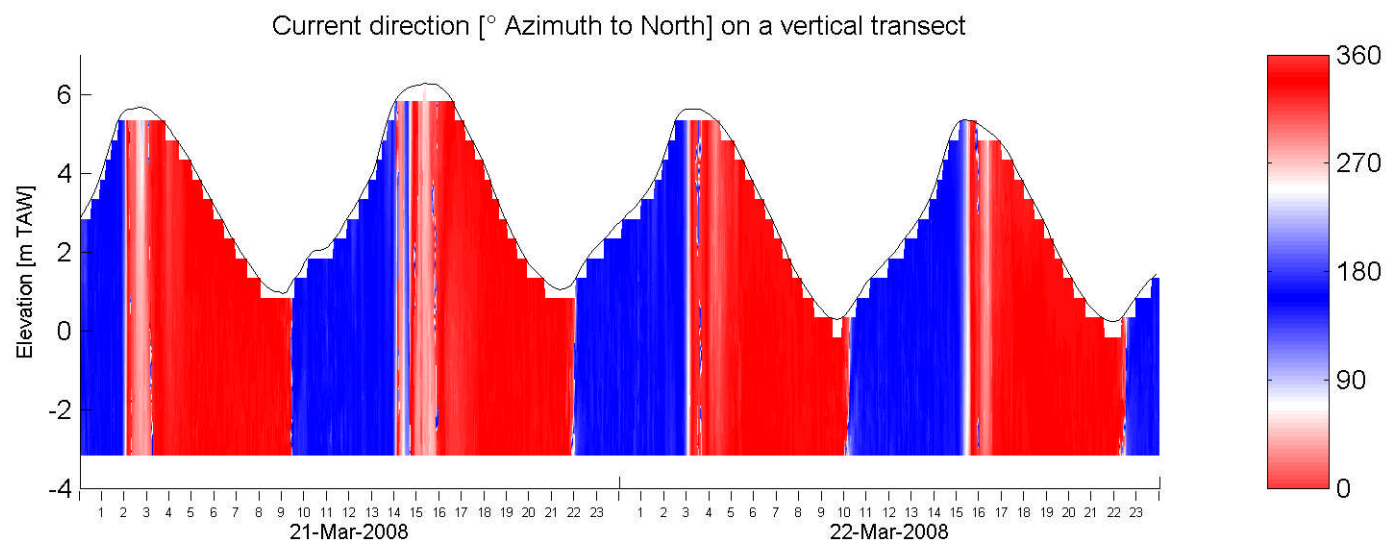
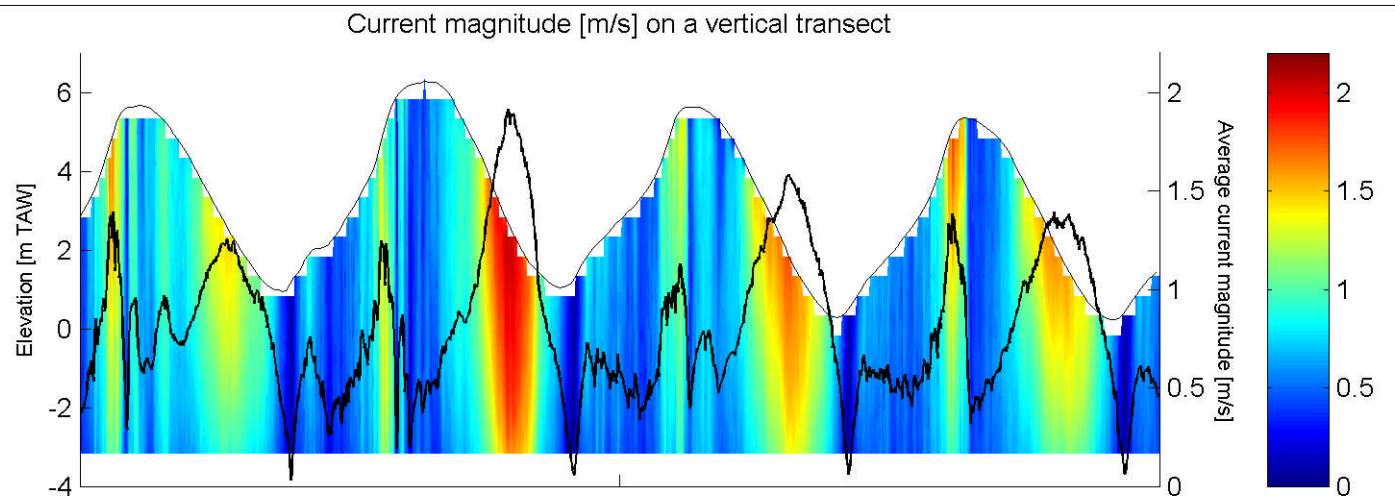








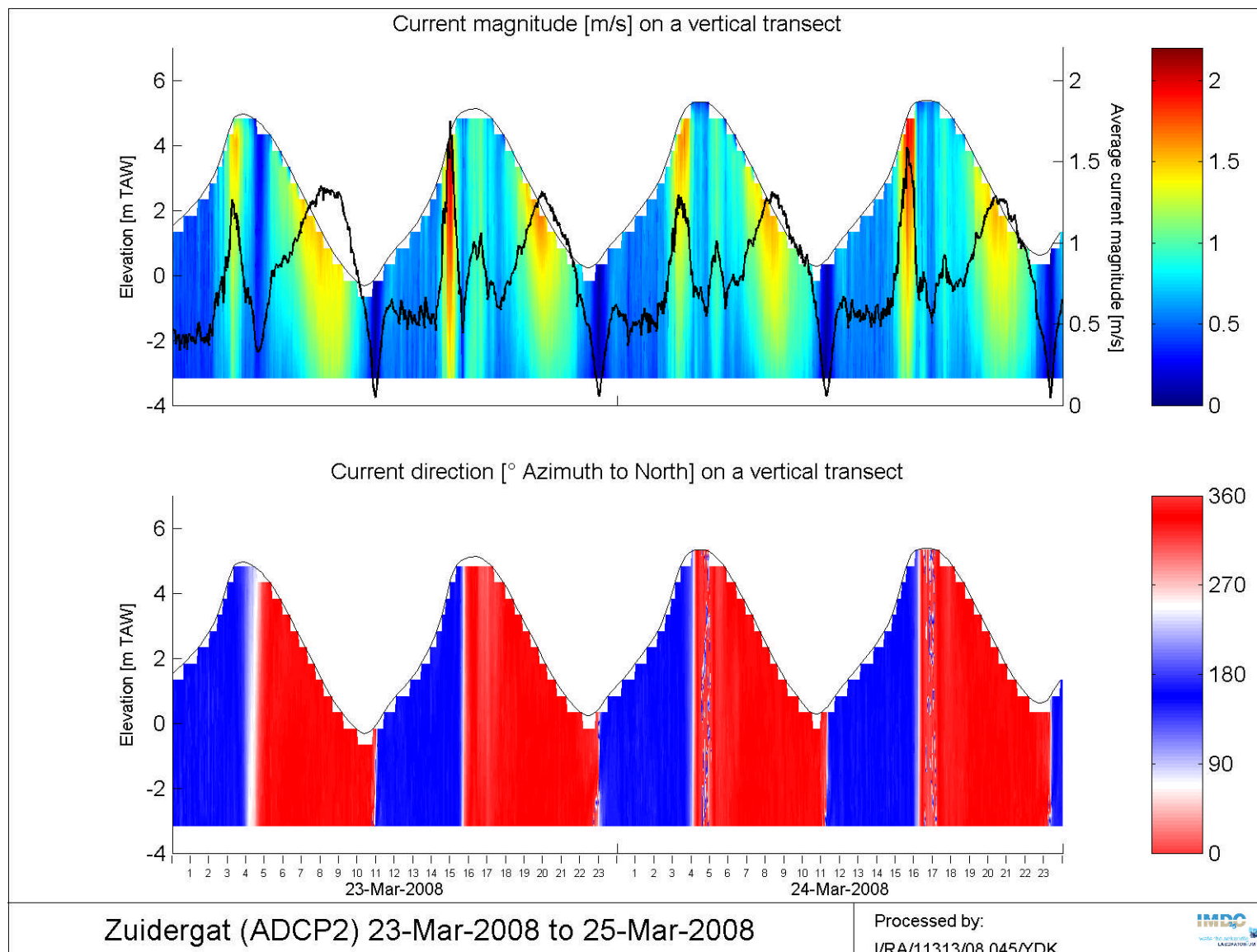




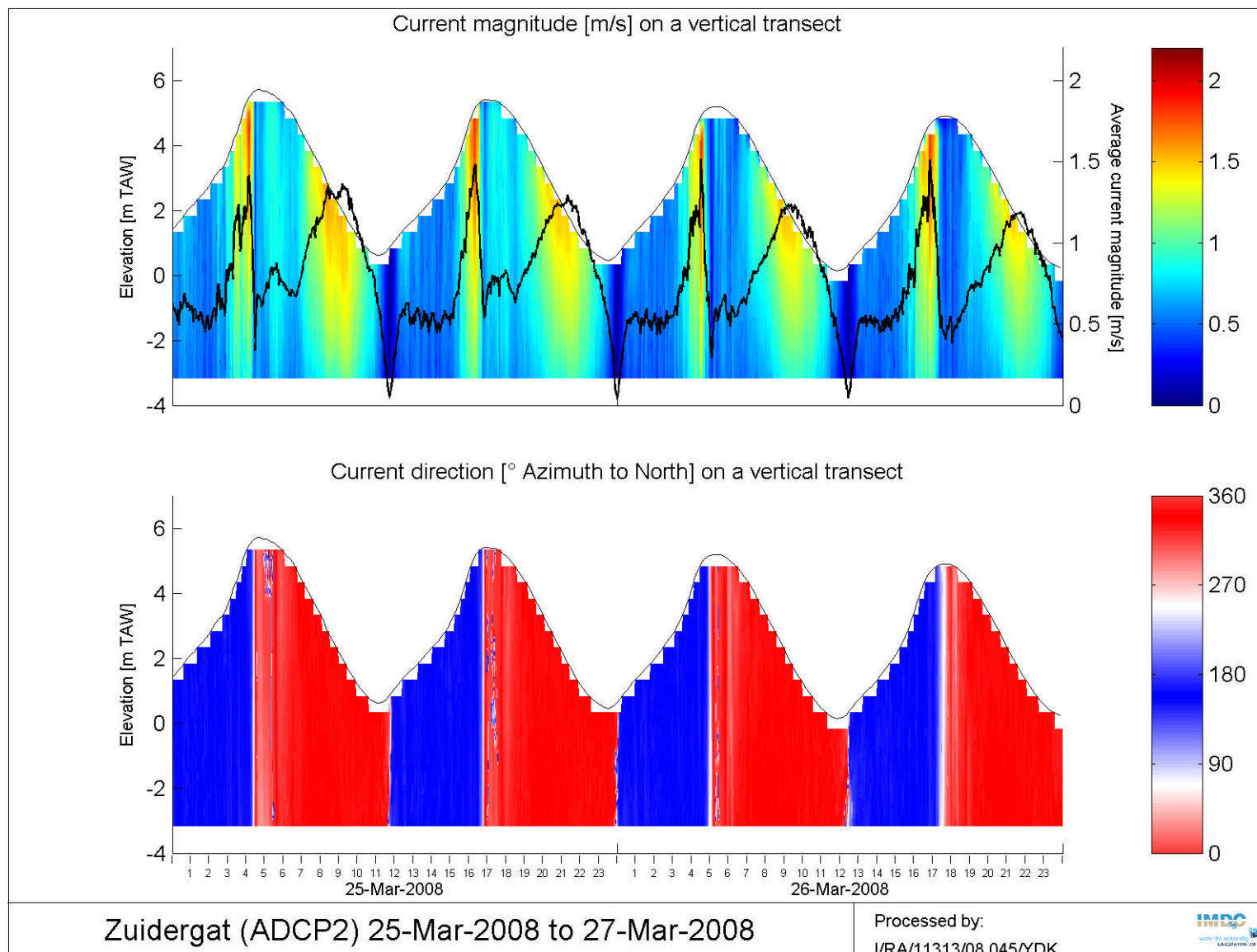
Zuidergat (ADCP2) 21-Mar-2008 to 23-Mar-2008

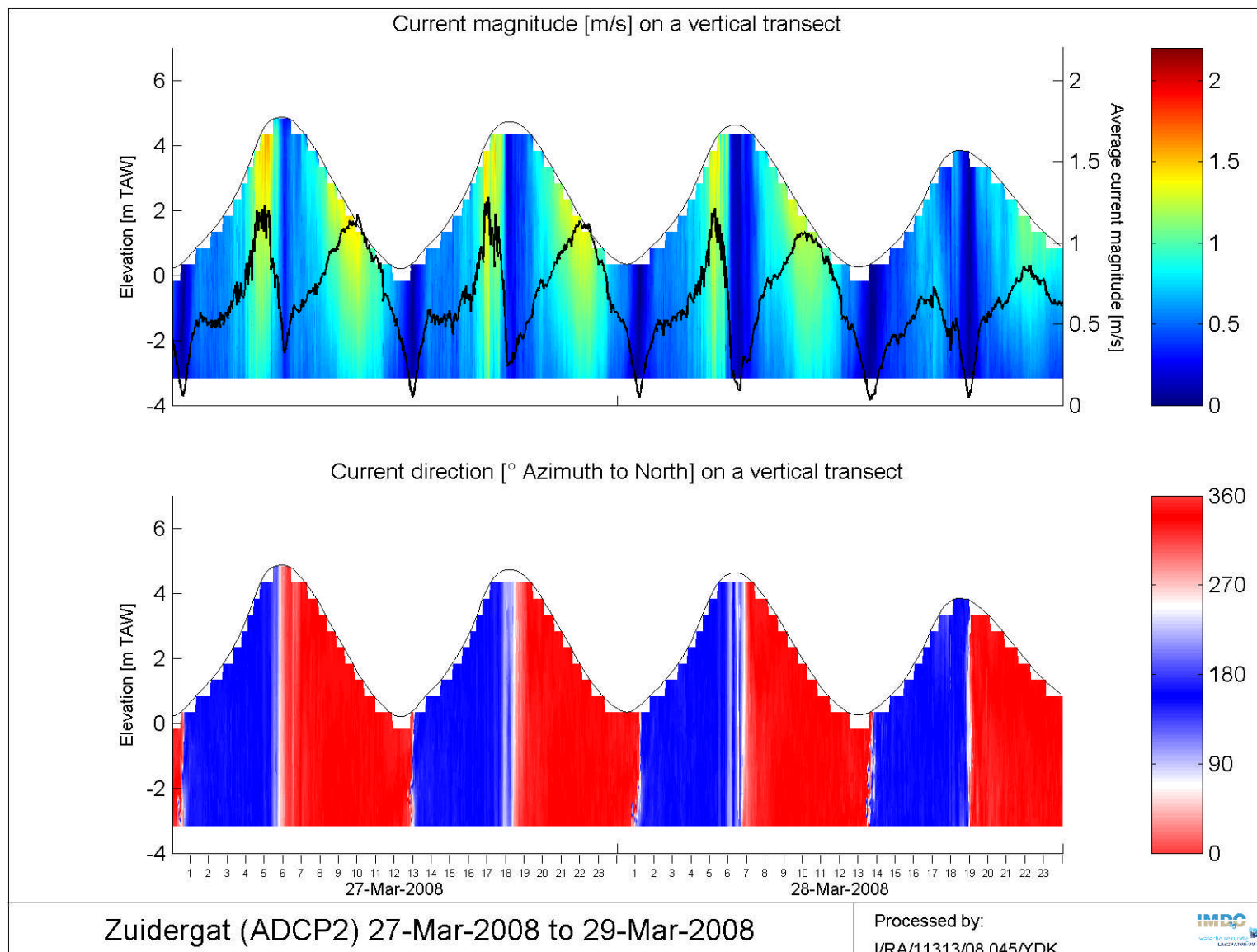
Processed by:  
I/RA/11313/08.045/YDK

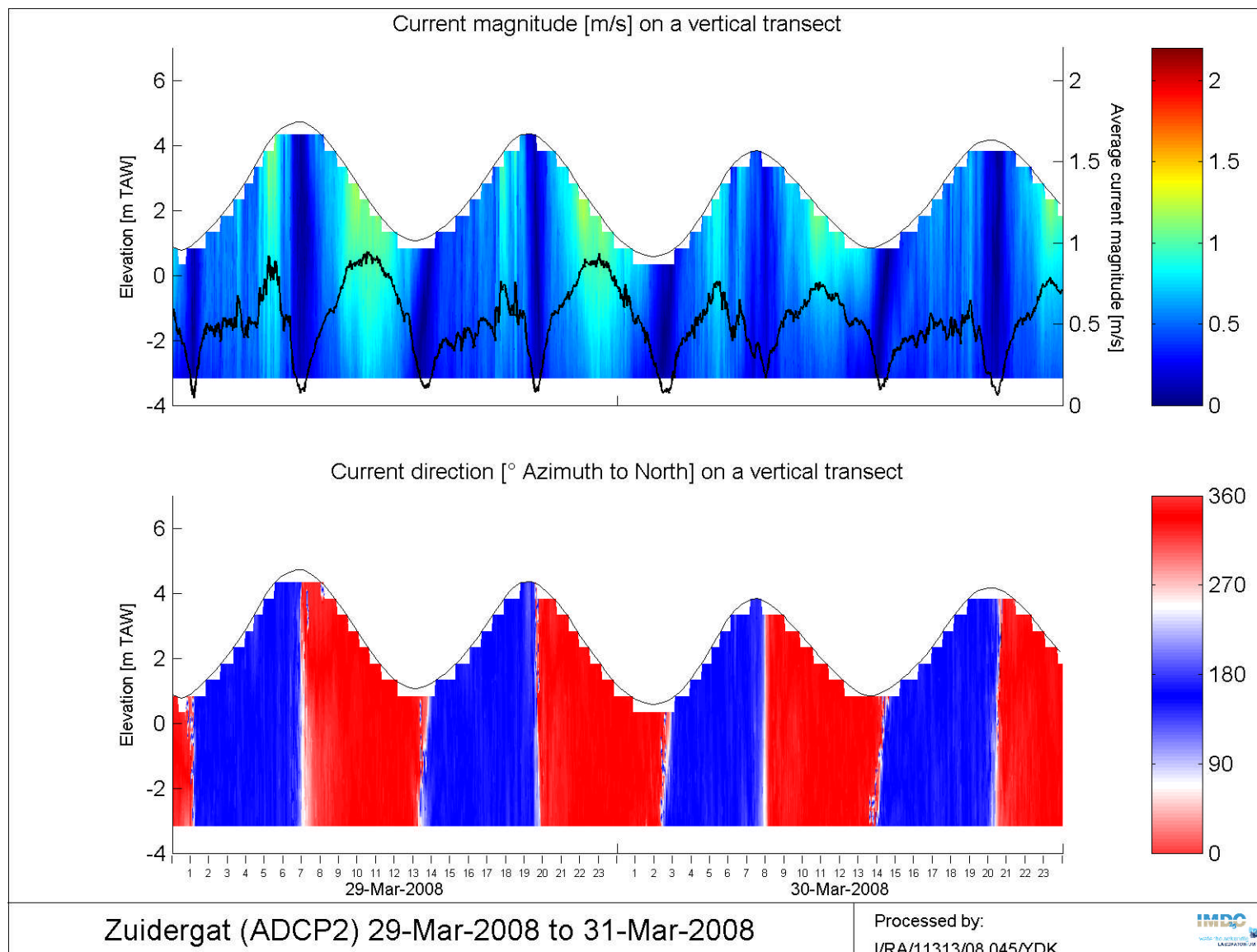




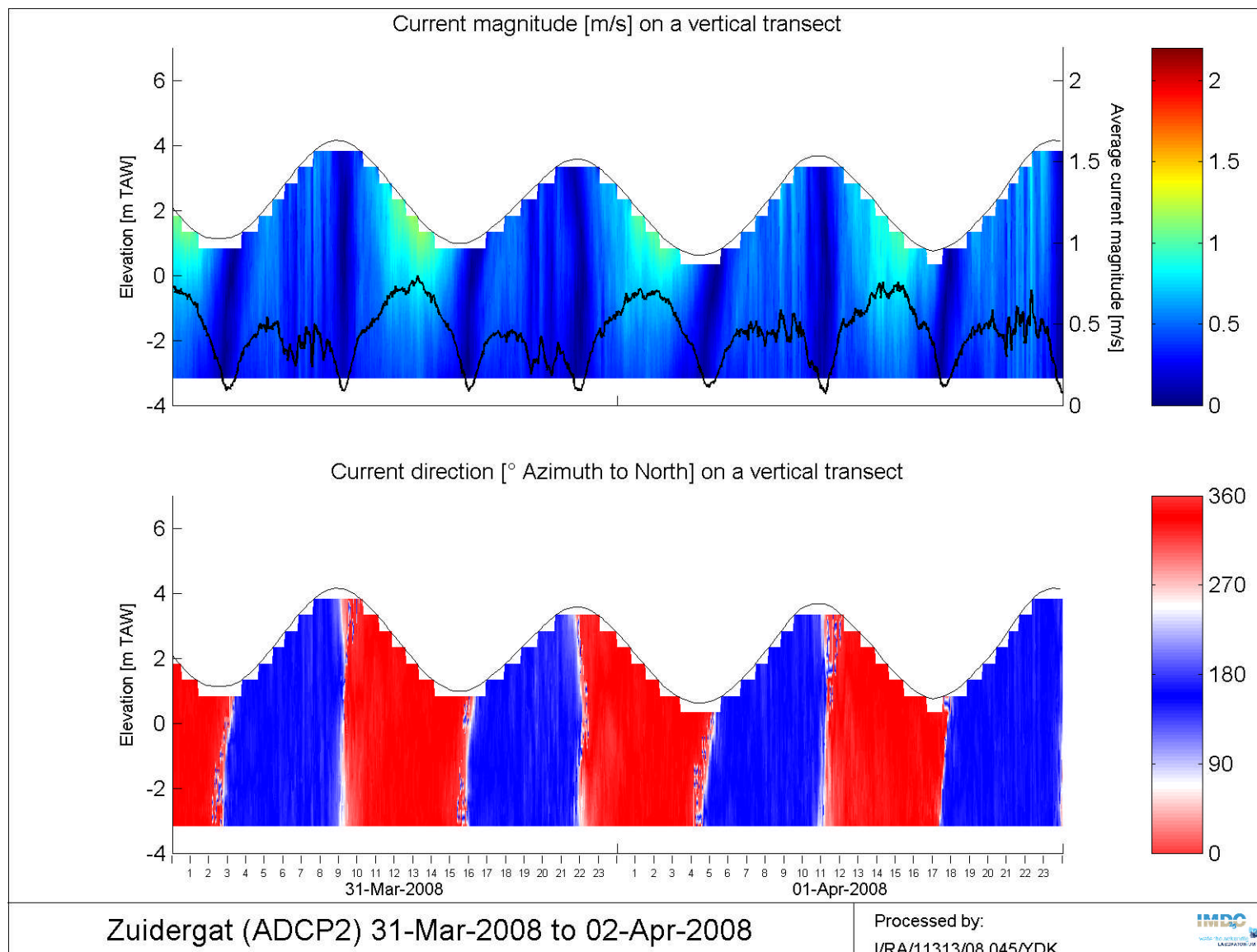


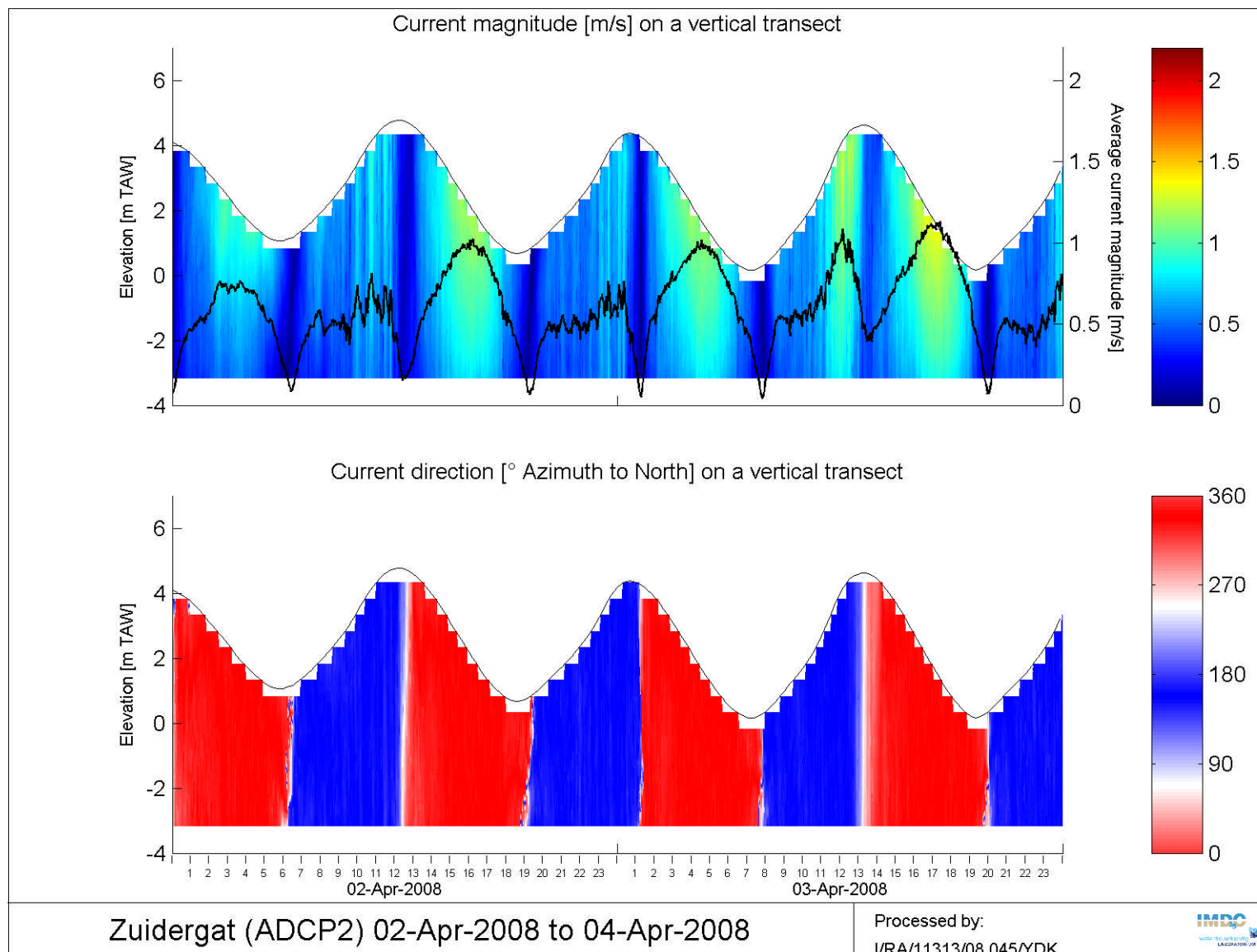


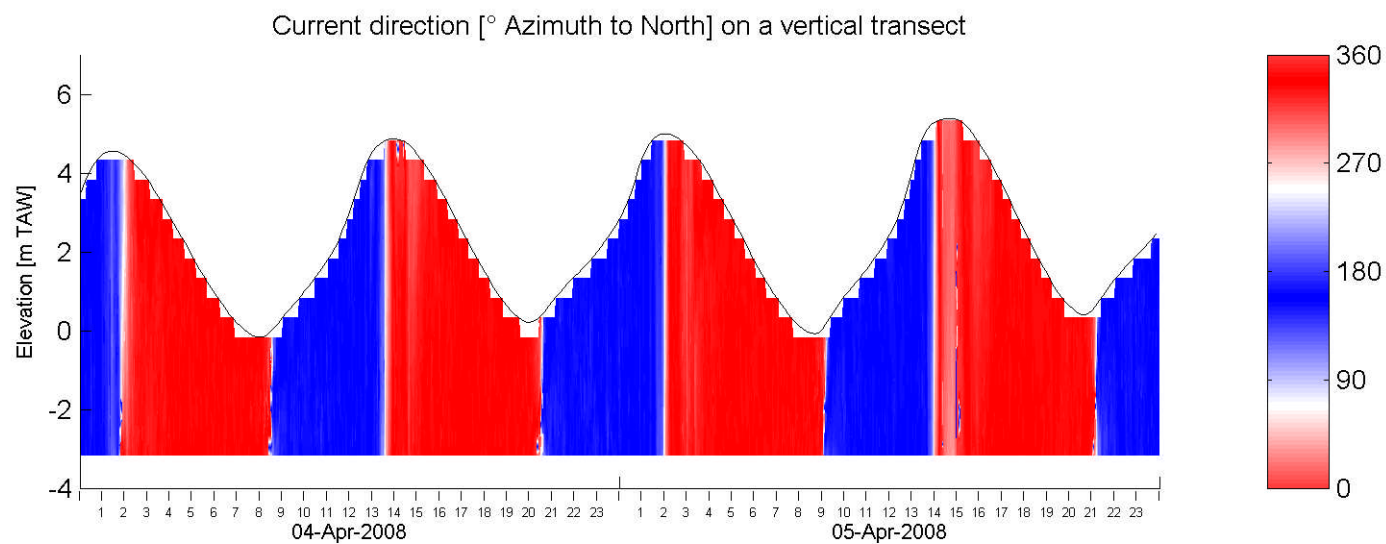
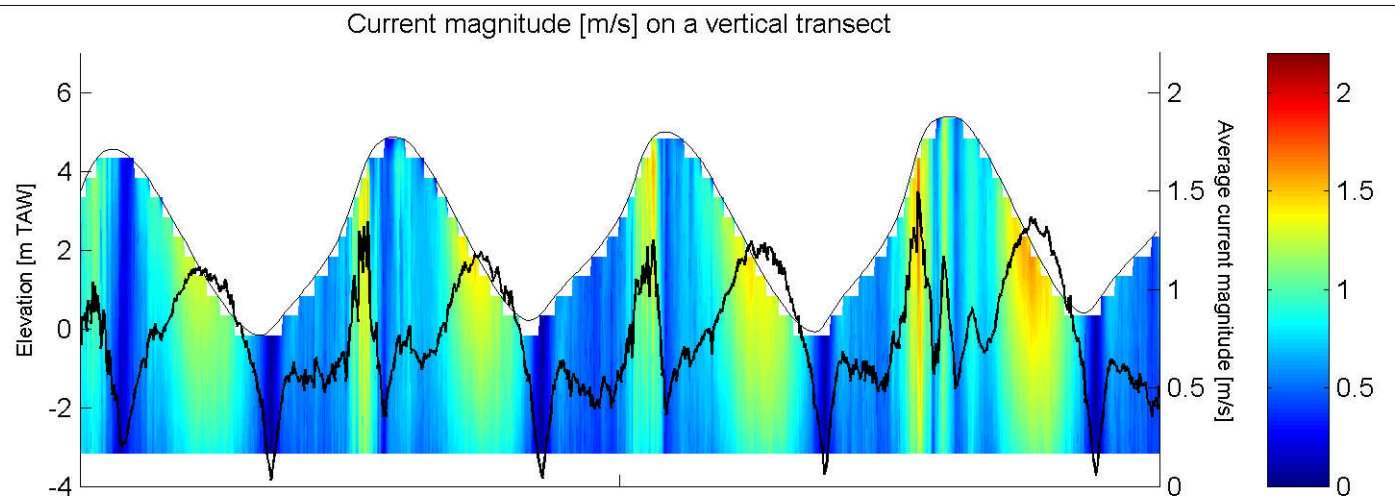








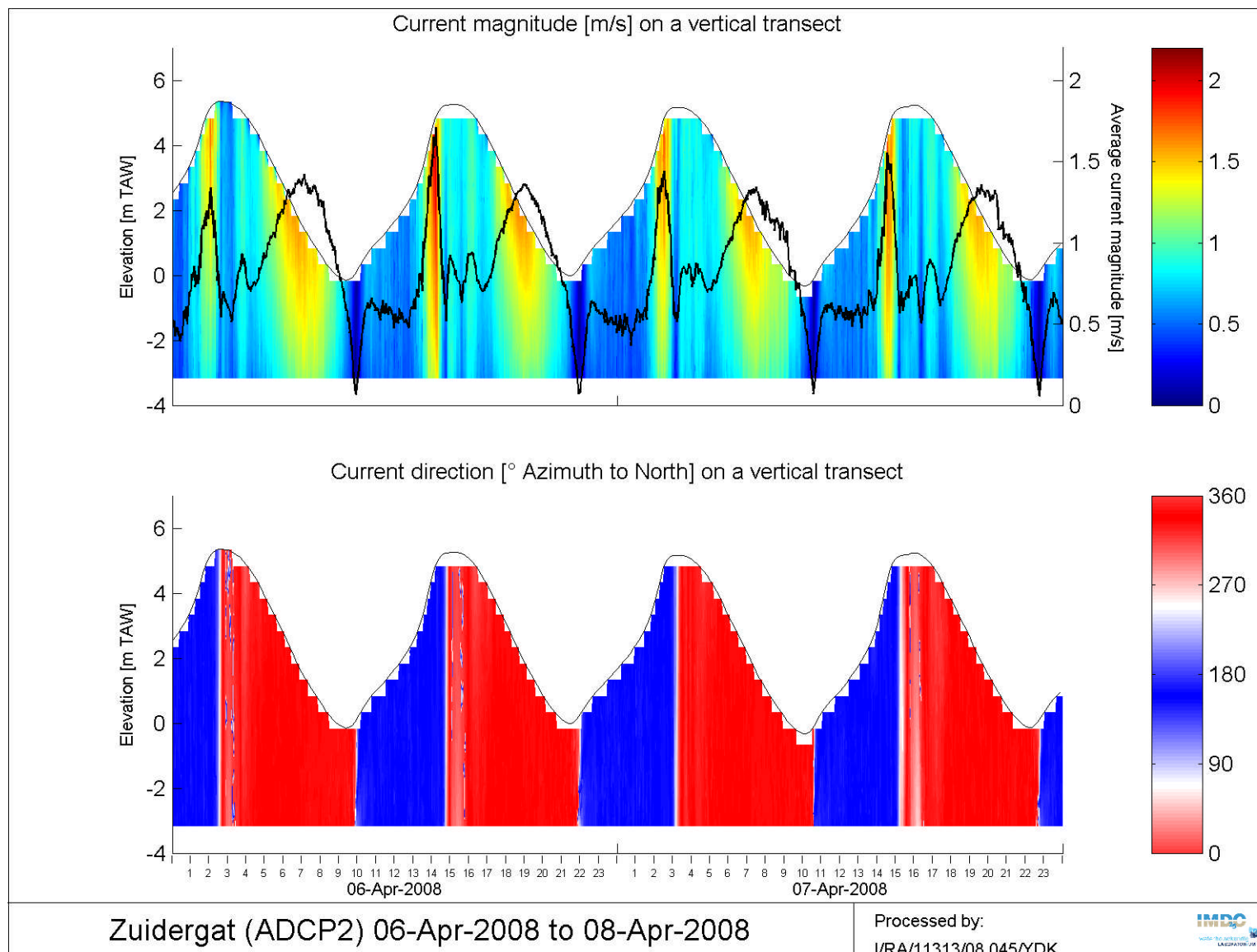


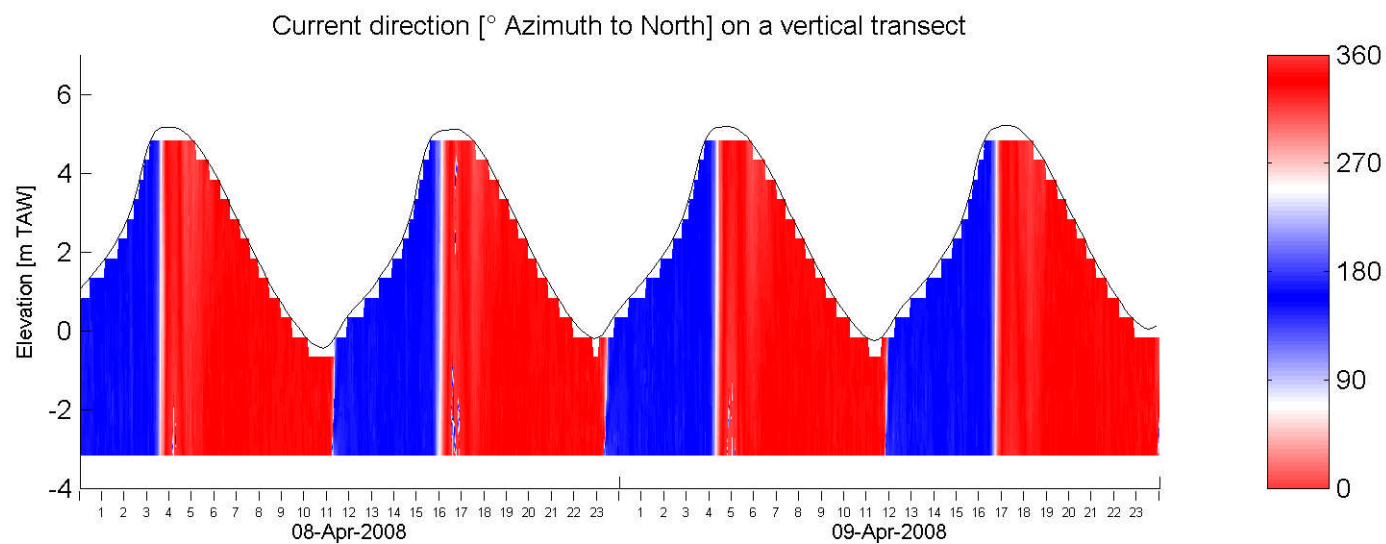
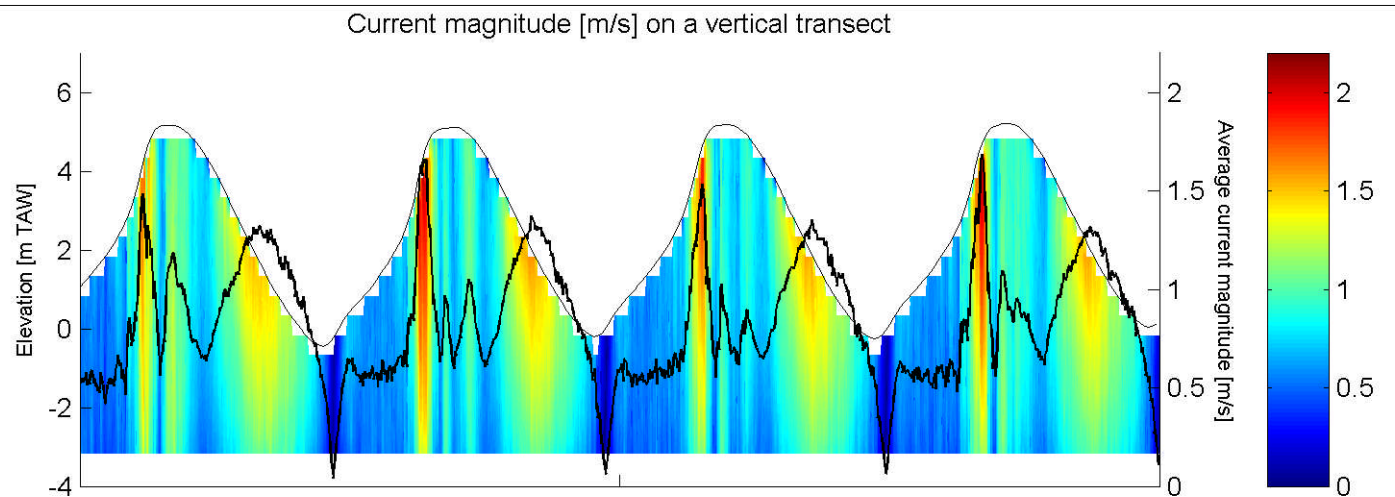


Zuidergat (ADCP2) 04-Apr-2008 to 06-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK





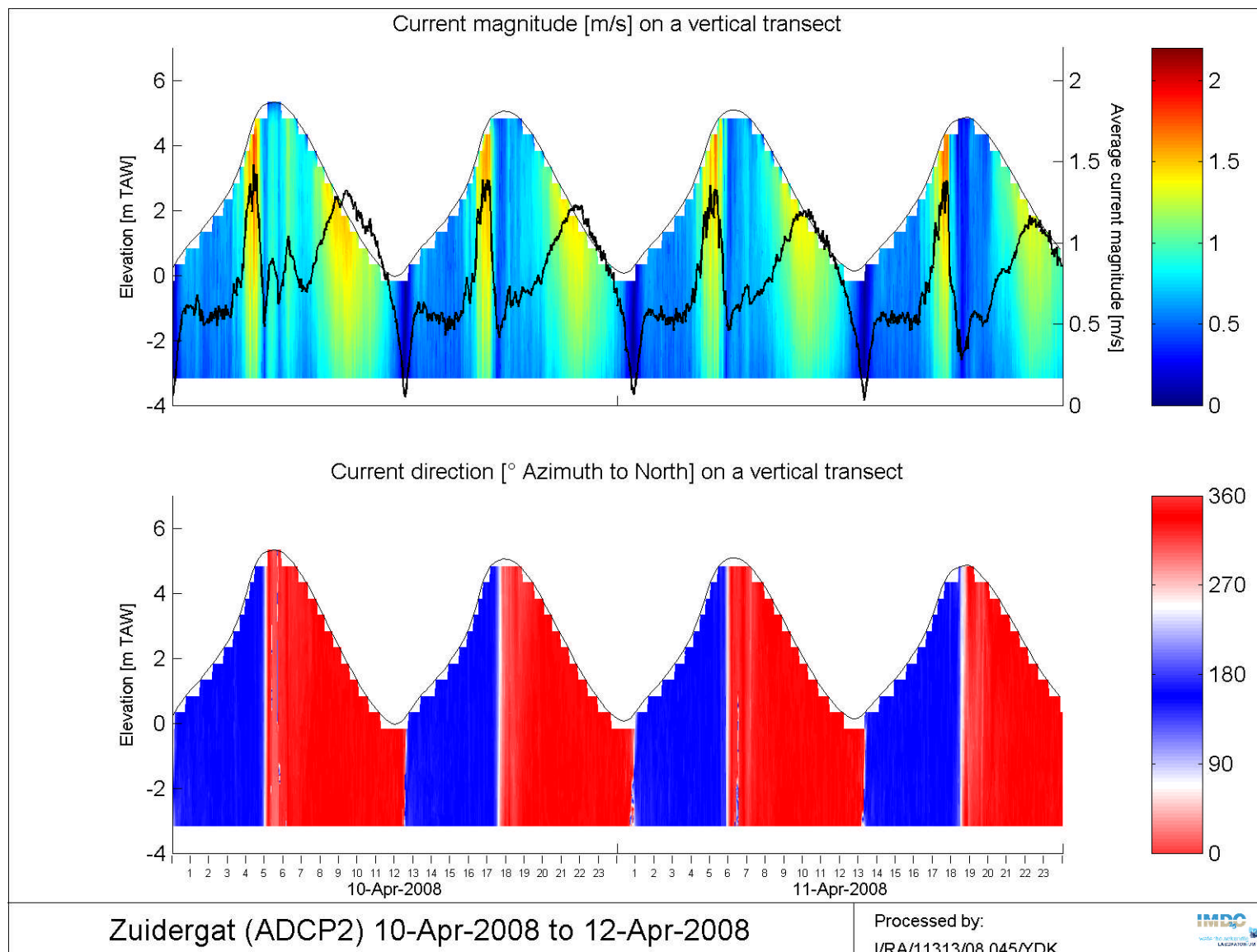


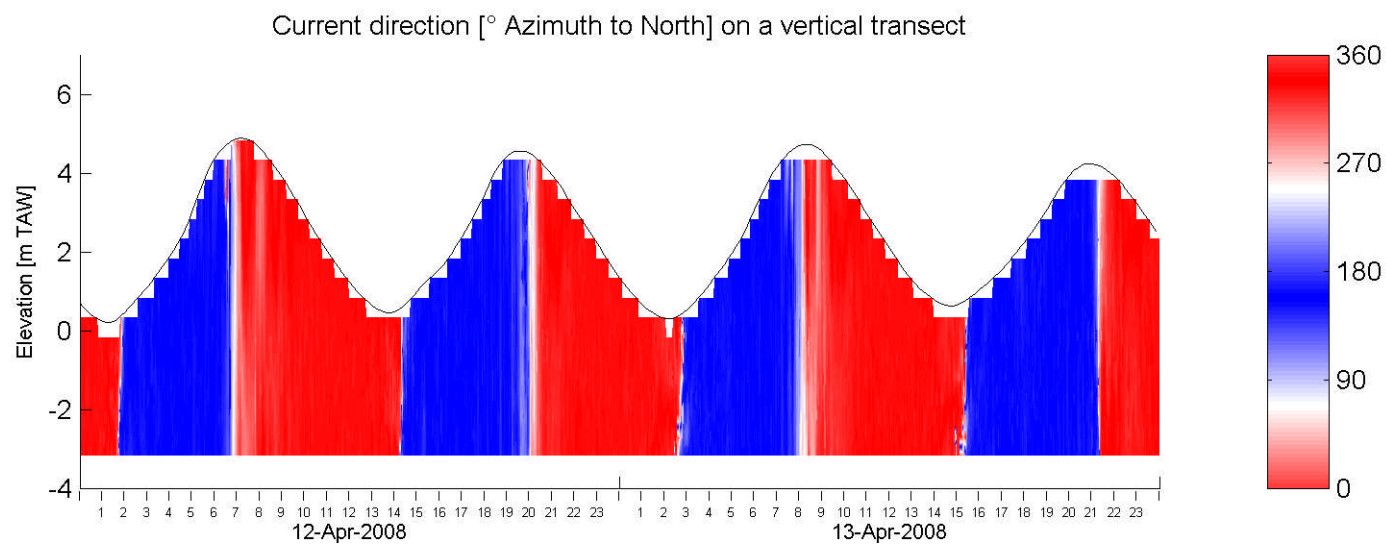
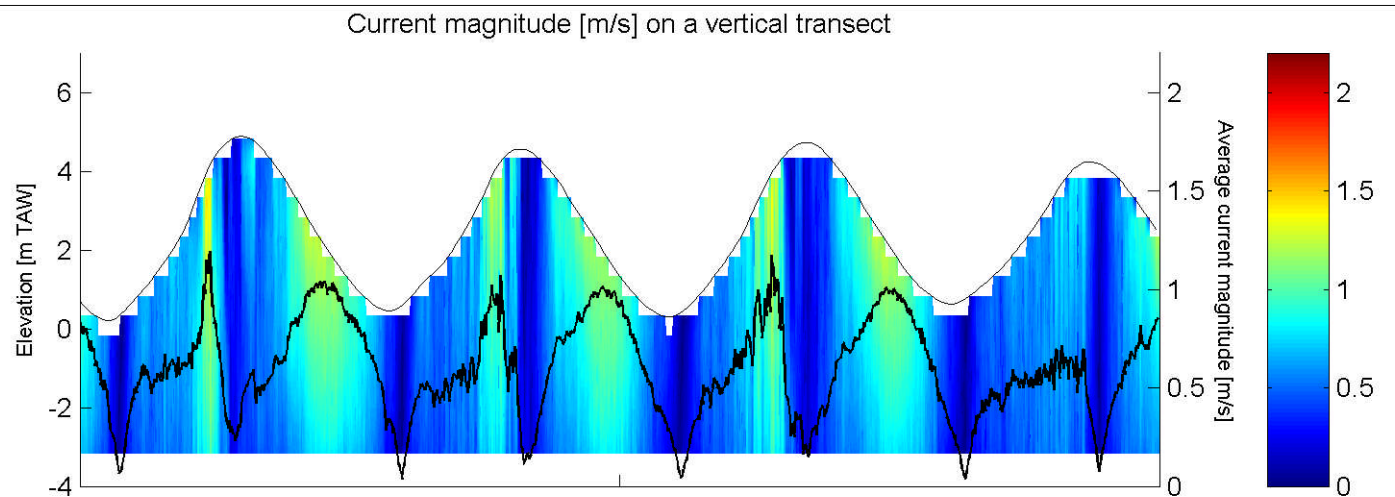
Zuidergat (ADCP2) 08-Apr-2008 to 10-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK





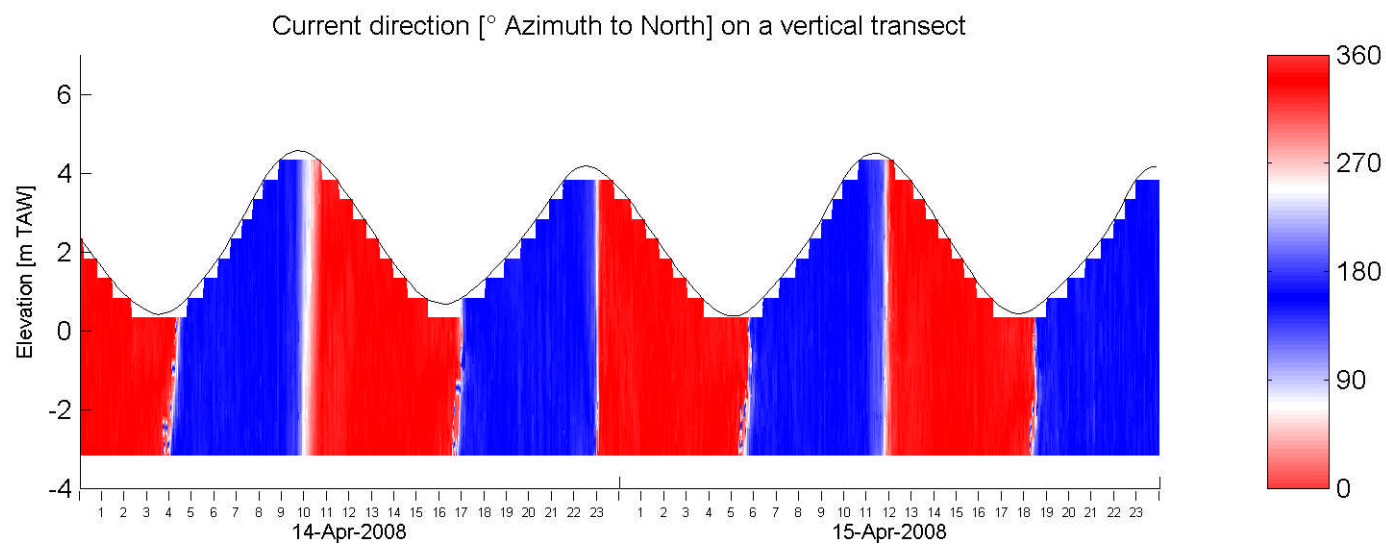
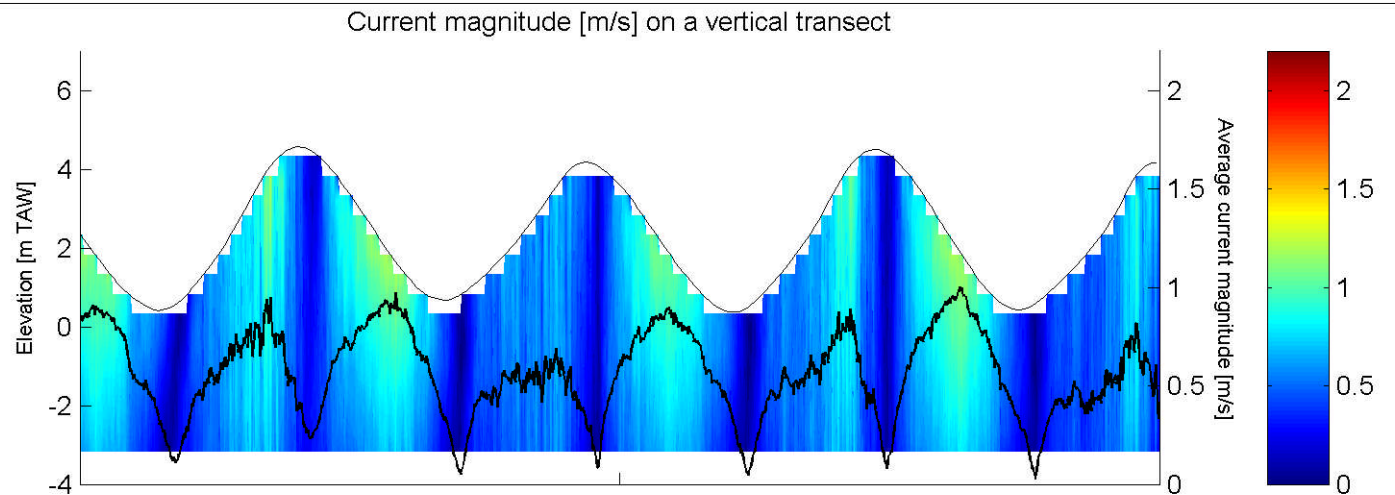




Zuidergat (ADCP2) 12-Apr-2008 to 14-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK

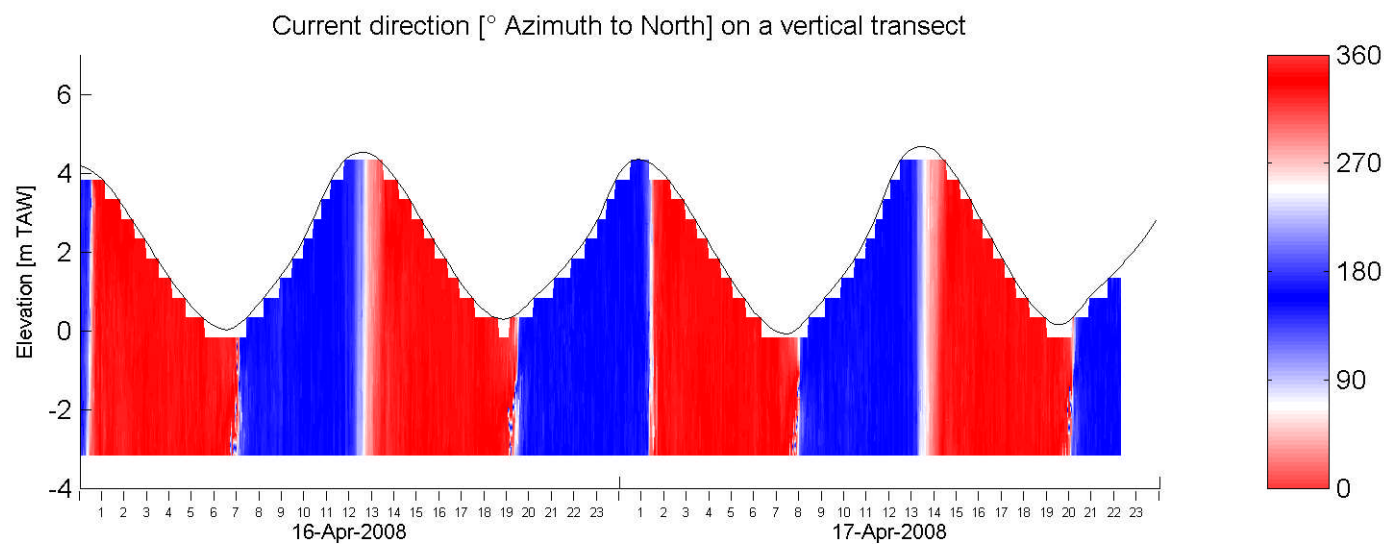
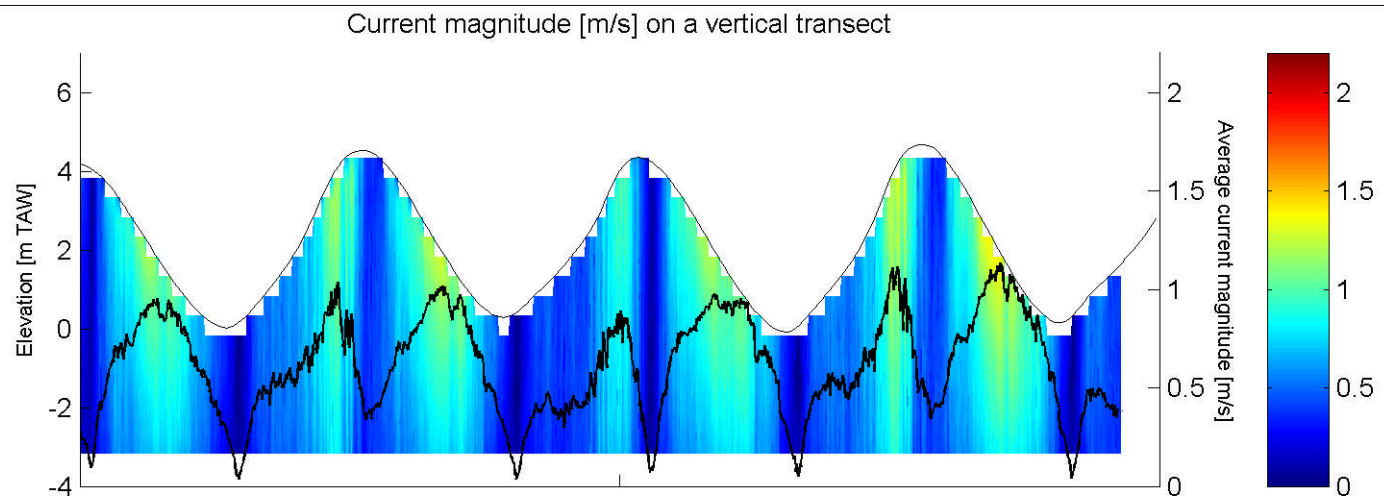




Zuidergat (ADCP2) 14-Apr-2008 to 16-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK

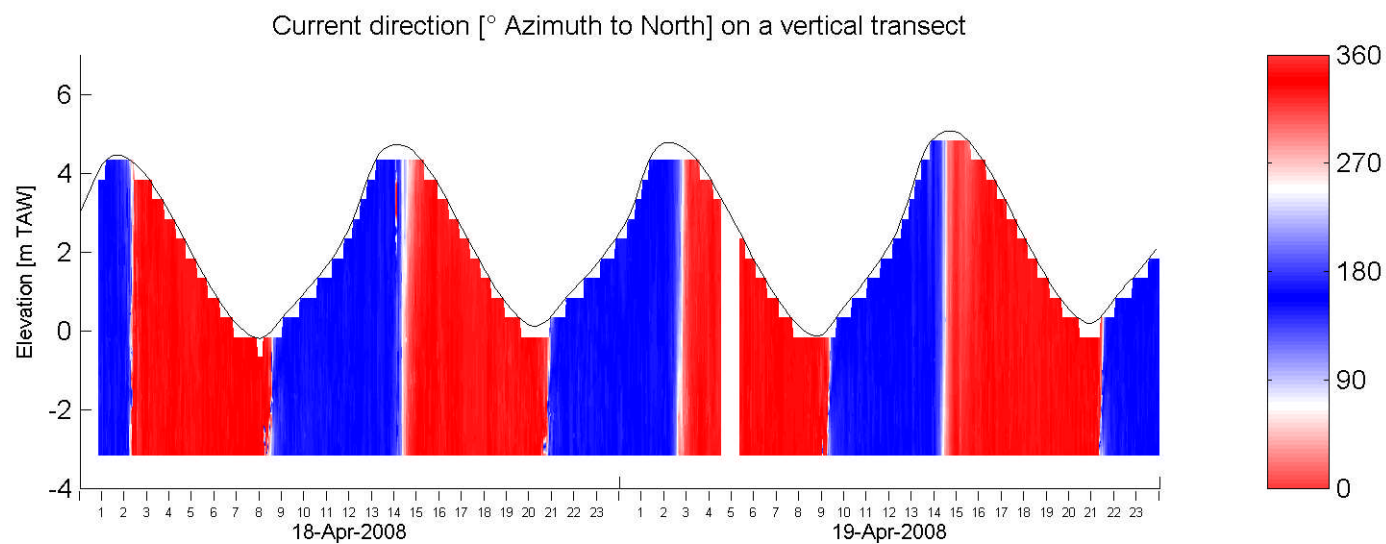
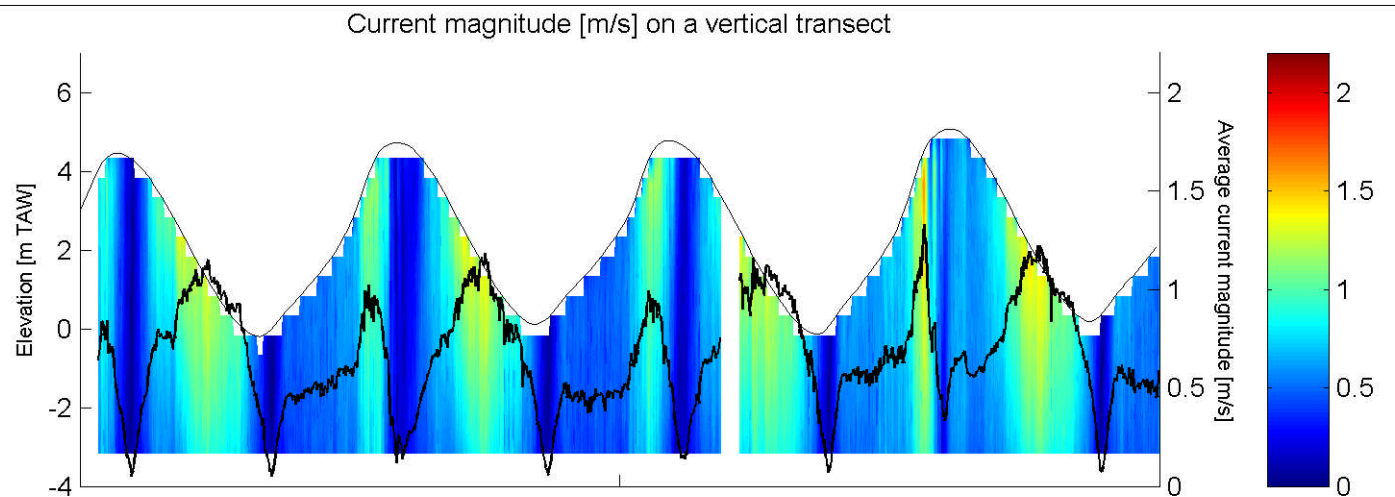




Zuidergat (ADCP2) 16-Apr-2008 to 18-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK

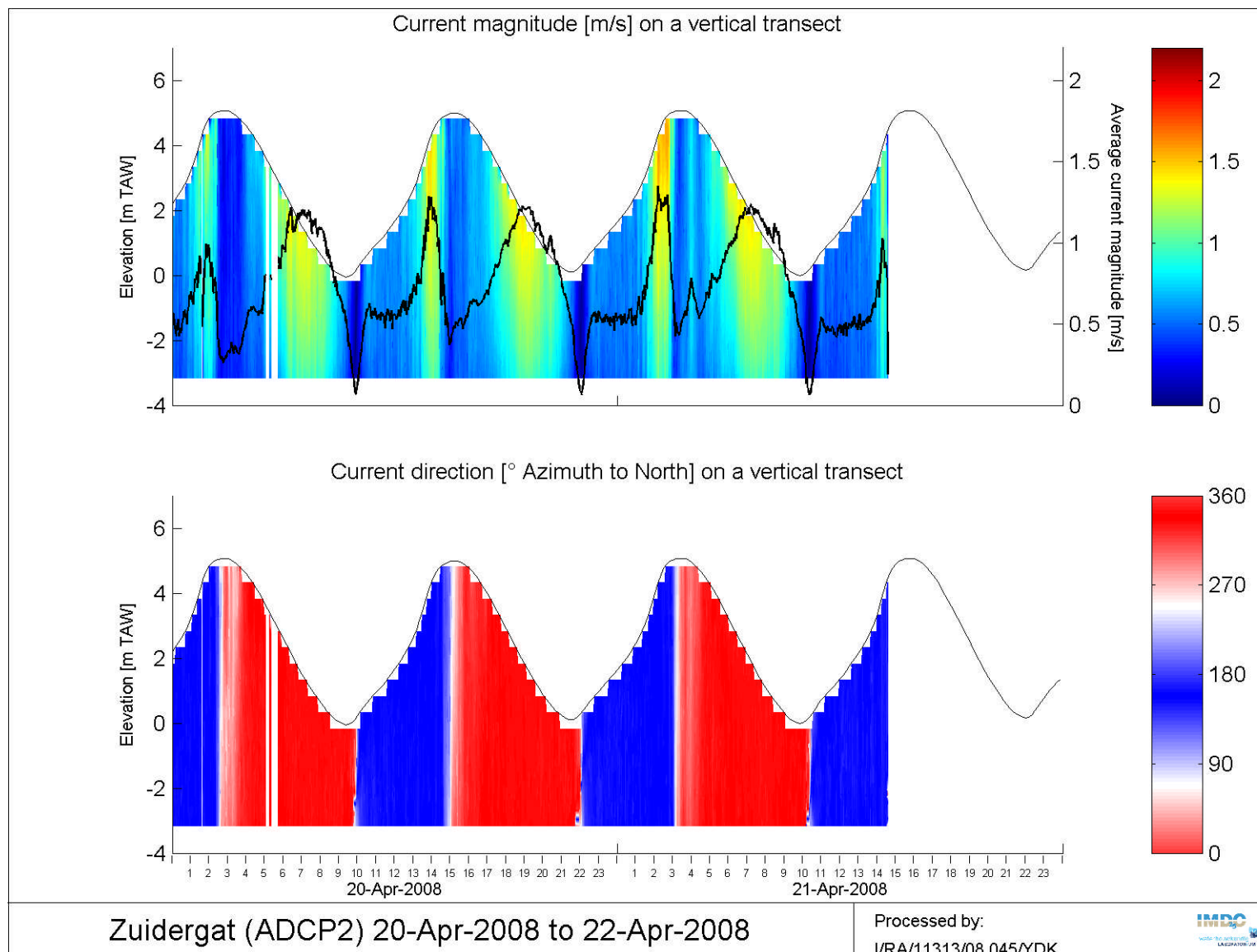




Zuidergat (ADCP2) 18-Apr-2008 to 20-Apr-2008

Processed by:  
I/RA/11313/08.045/YDK





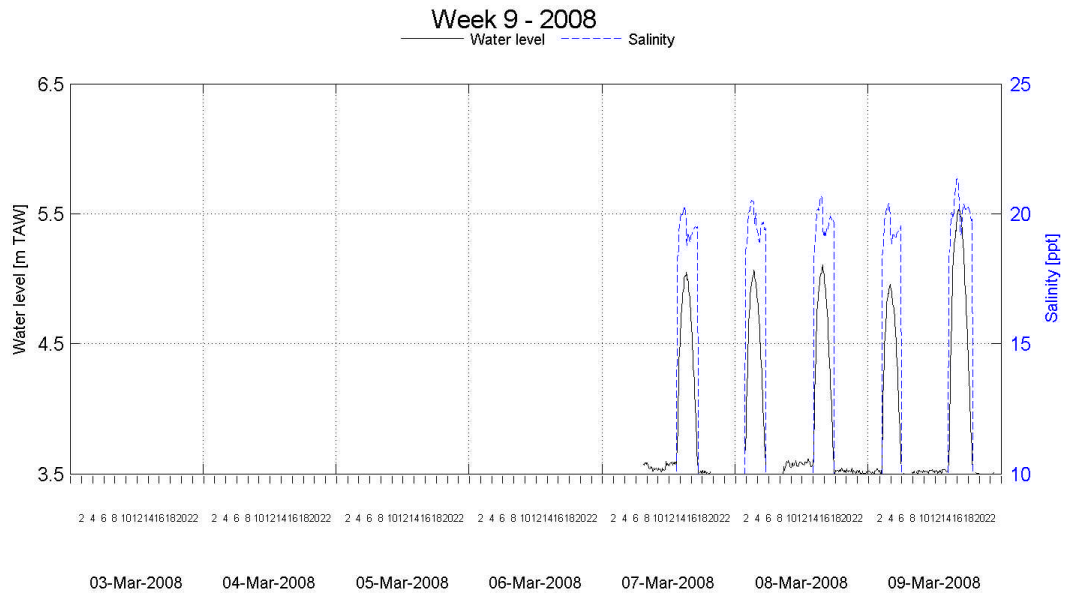
# **APPENDIX F.**

## **TIJDREEKSEN VAN WATERNIVEAU EN SALINITEIT**

### **(CTD)**

## **F.1 CTD 1**

## Factual data Report meetcampagne Ossensisse 03-04/2008



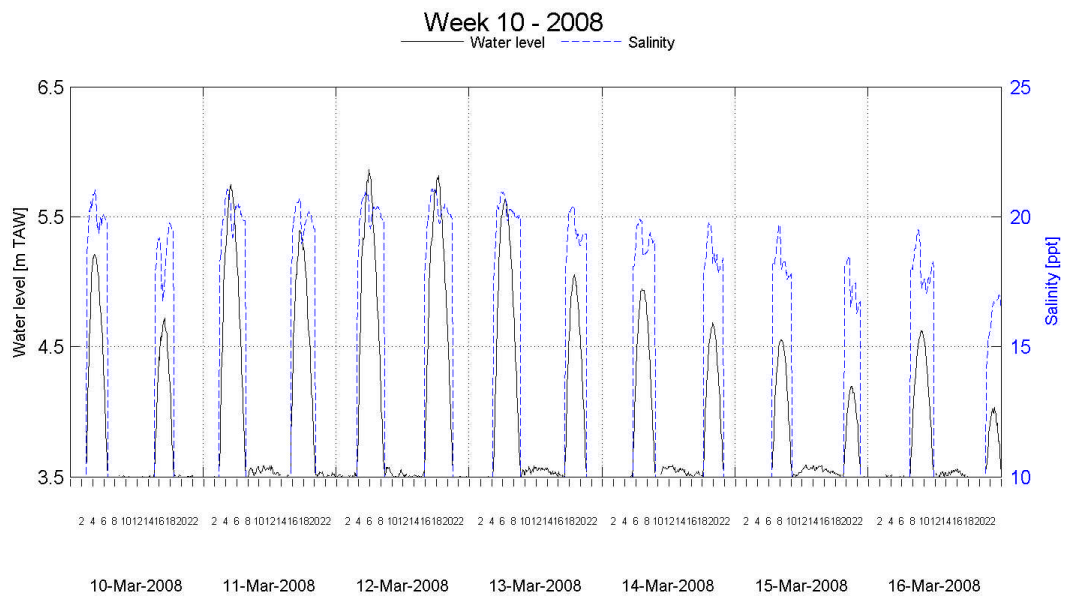
Weekseries water level and salinity.

Location:

Zuidergat

Processed by: **IMDC**  
In Association **waterbouwkundig LABORATORIUM**  
I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



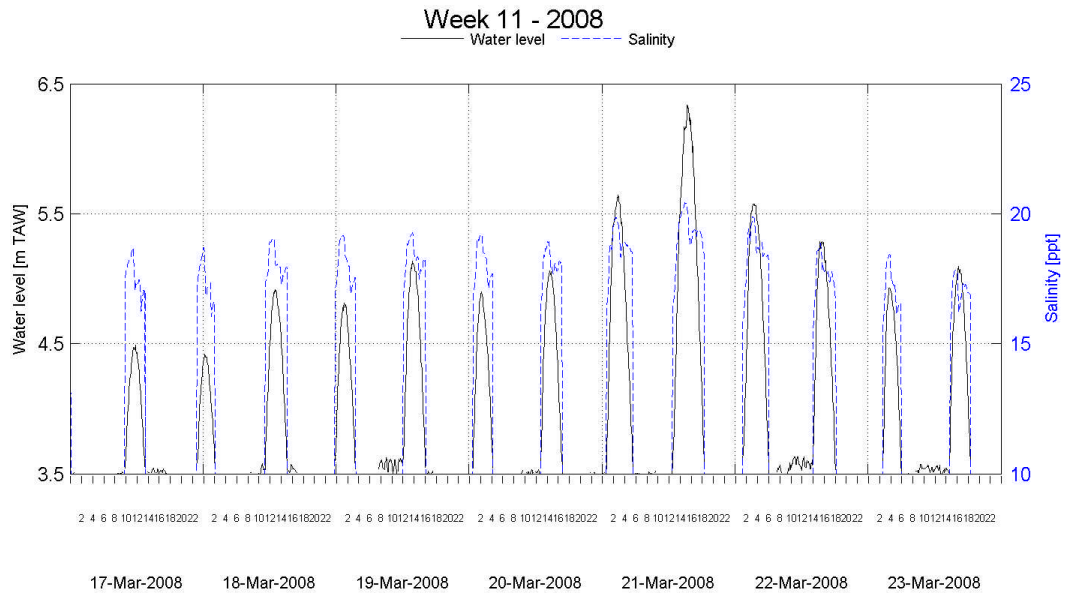
Weekseries water level and salinity.

Location:

Zuidergat

Processed by: **IMDC**  
In Association **waterbouwkundig LABORATORIUM**  
I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



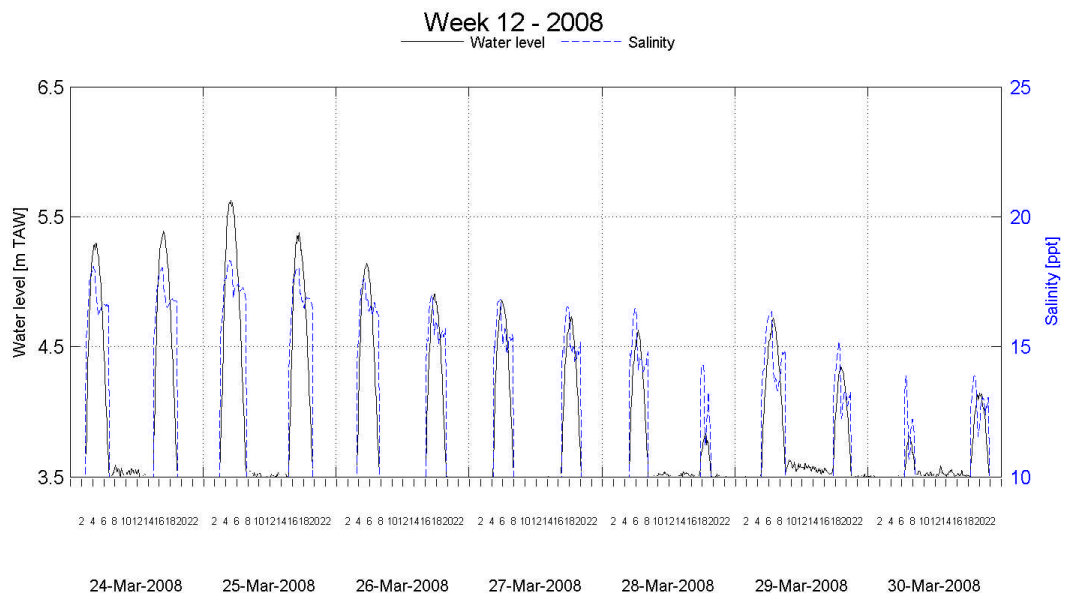
Weekseries water level and salinity.

Location:

Zuidergat

Processed by: **IMDC**  
 In Association **waterbouwkundig LABORATORIUM**  
 I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



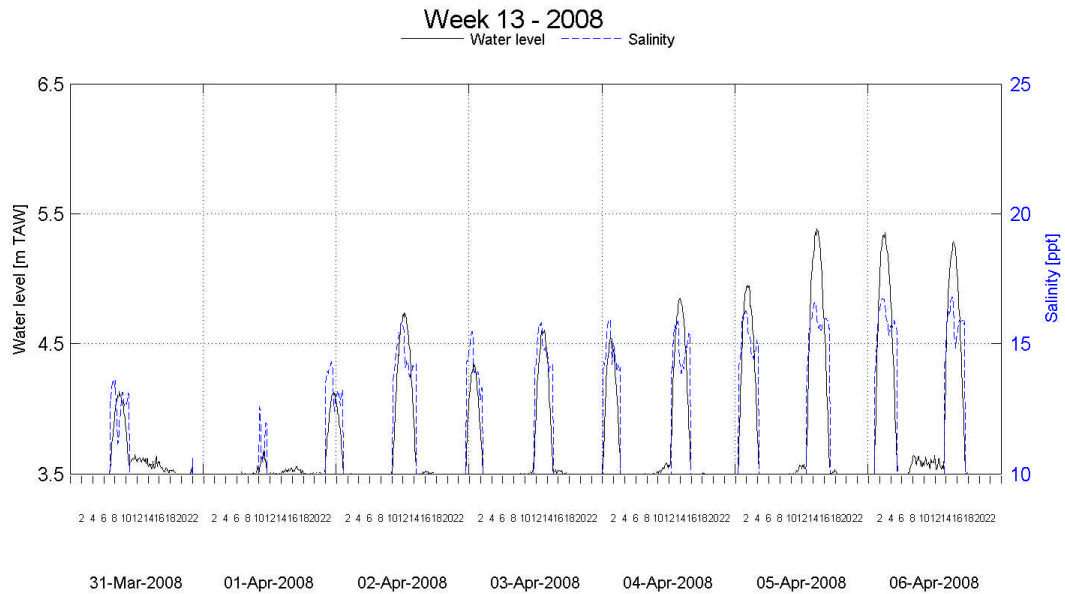
Weekseries water level and salinity.

Location:

Zuidergat

Processed by: **IMDC**  
 In Association **waterbouwkundig LABORATORIUM**  
 I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



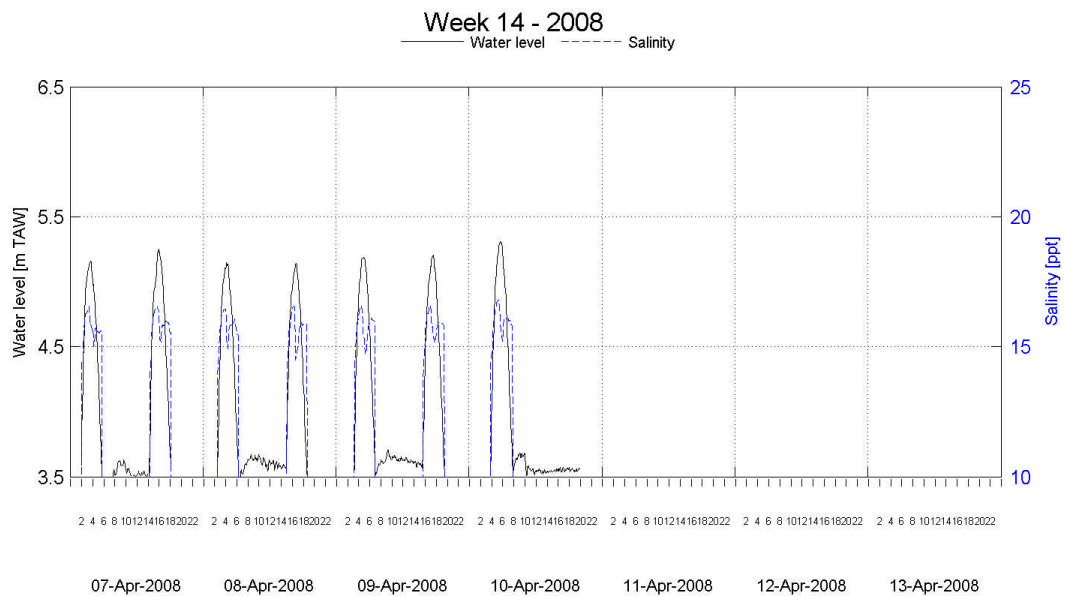
Weekseries water level and salinity.

Location:

Zuidergat

Processed by: **IMDC**  
 In Association **waterbouwkundig LABORATORIUM**  
 I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



Weekseries water level and salinity.

Location:

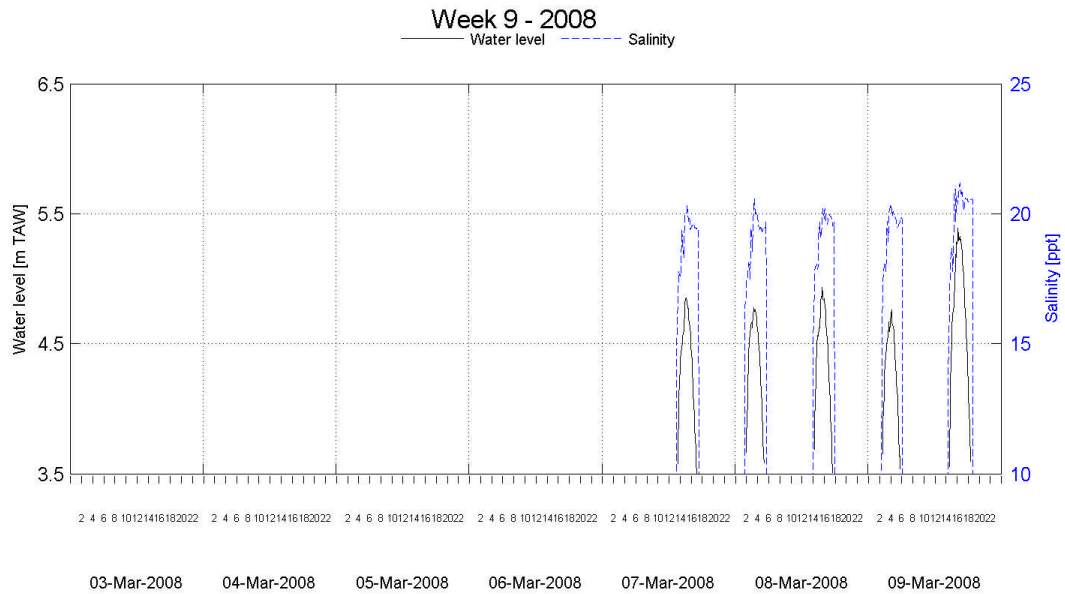
Zuidergat

Processed by: **IMDC**  
 In Association **waterbouwkundig LABORATORIUM**  
 I/RA/11313/08.045/YDK



## **F.2 CTD 2**

## Factual data Report meetcampagne Ossensisse 03-04/2008



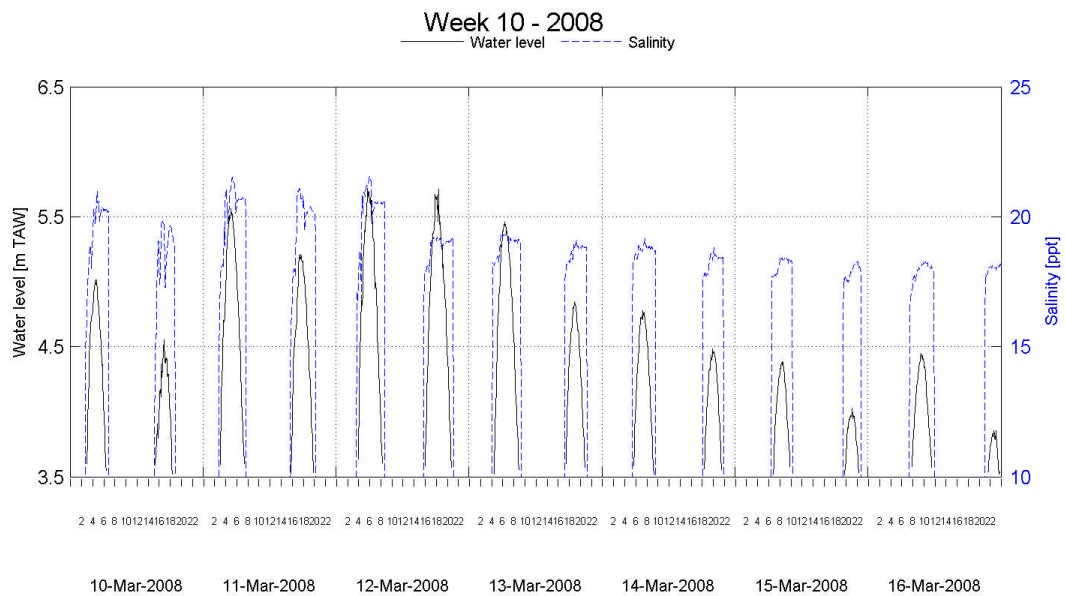
Weekseries water level and salinity

Location:

Zuidergat

Processed by: **IMDC**  
 In Association **waterbouwkundig LABORATORIUM**  
 I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



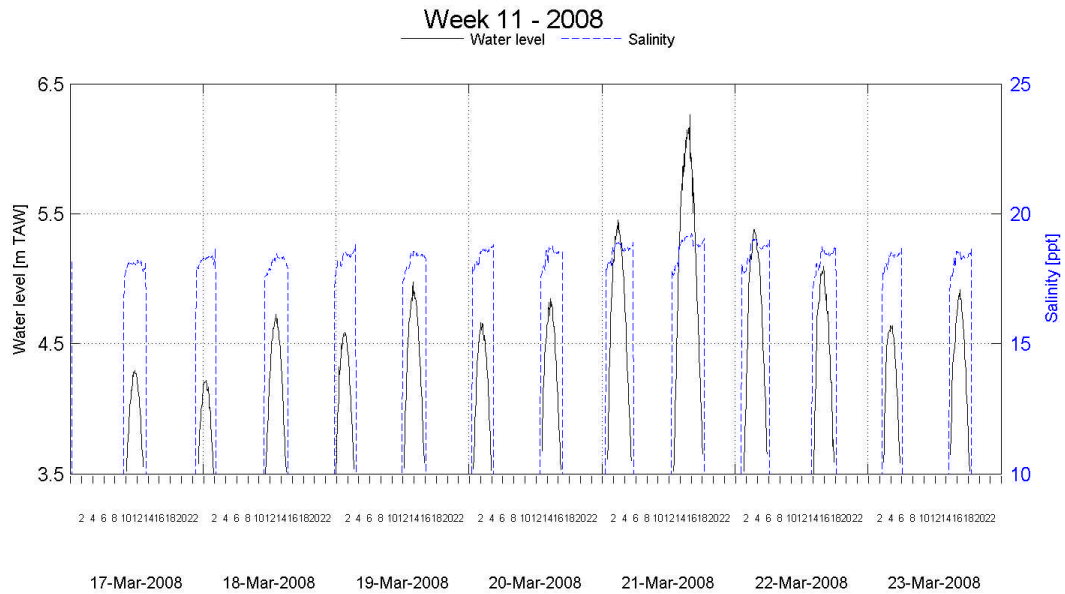
Weekseries water level and salinity

Location:

Zuidergat

Processed by: **IMDC**  
 In Association **waterbouwkundig LABORATORIUM**  
 I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



Weekseries water level and salinity

Location:

Zuidergat

Processed by:

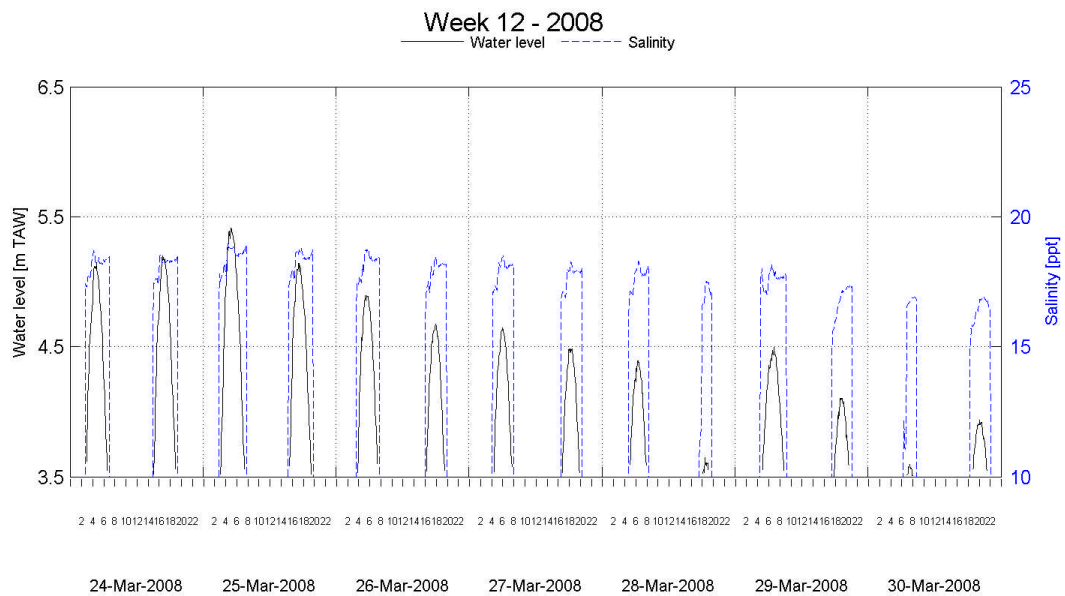


In Association

waterbouwkundig  
LABORATORIUM

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## Factual data Report meetcampagne Ossensisse 03-04/2008



Weekseries water level and salinity

Location:

Zuidergat

Processed by:

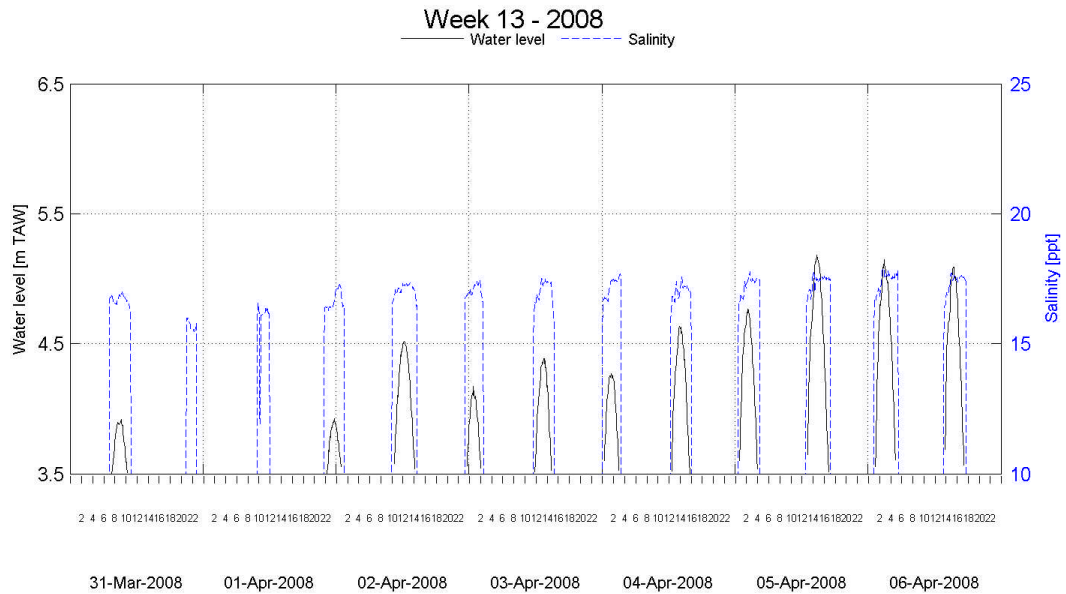


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I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



Weekseries water level and salinity

Location:

Zuidergat

Processed by:

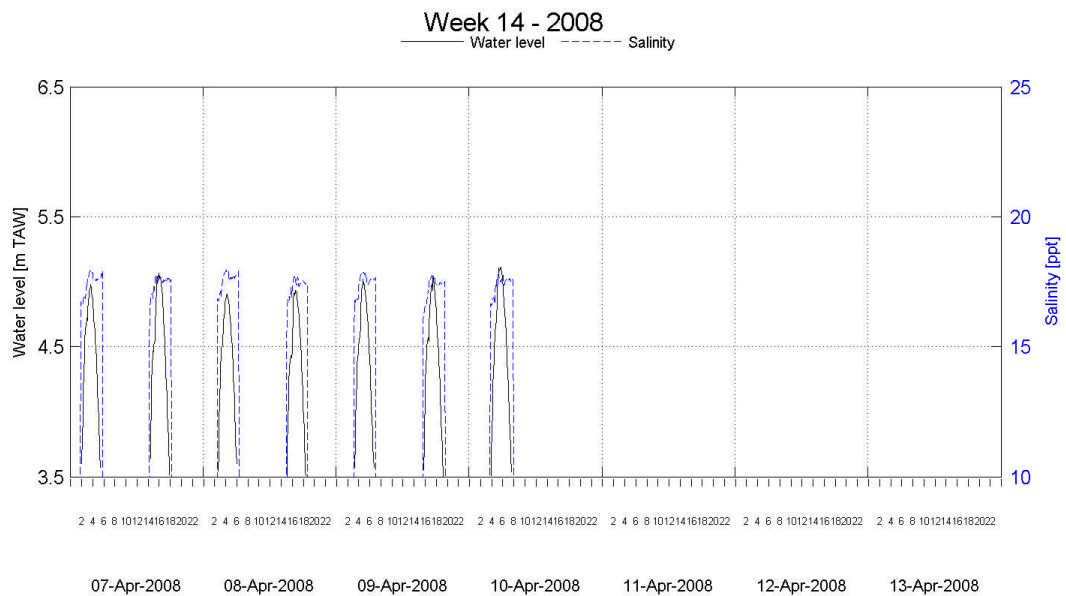


In Association

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LABORATORIUM

I/RA/11313/08.045/YDK

## Factual data Report meetcampagne Ossensisse 03-04/2008



Weekseries water level and salinity

Location:

Zuidergat

Processed by:



In Association

waterbouwkundig  
LABORATORIUM

I/RA/11313/08.045/YDK